

University of Misan

جامعة ميسان



Bachelor's degree (B.Sc.) in Mechanical Engineering

بكالوريوس في الهندسة الميكانيكية



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1. Overview

This catalog is about the courses (modules) given by the Mechanical Engineering degree program. The program delivers (50) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة الميكانيكية للحصول على درجة البكالوريوس. حيث يقدم البرنامج (45) مادة دراسية مع (6000) ساعة، إجمالي ساعات حمل الطالب، و(240) إجمالي وحدات اوروبية. يعتمد تقديم المواد الدراسية على مسار بولونيا.

2. Undergraduate Modules 2024-2025

Model 1			
Code	Course/Module Title	ECTS	Year /Semester
ENG122	Mathematics I	5	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62
Description			
Mathematics contributes to the core of engineering and serves as a source of knowledge from which engineering students can draw from. Thus, engineering students must be able to apply mathematical knowledge and skills to problem-solving and engineering design tasks. Mathematical or engineering knowledge			

without understanding how to use the learned strategies can limit students' ability to provide correct answers.

Model 2

Code	Course/Module Title	ECTS	Year /Semester
ME112	Mechanical Engineering Static	5	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	1	78	47

Description

The module aims are:

1. Preparing and qualifying specialized engineers to meet the requirements of the labor market in its private and public sectors in static mechanics through diversifying the methods of learning, teaching, and training students to apply the acquired knowledge and skills to solve real problems.
2. Providing distinguished academic programs in the field of static mechanics, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market.
3. Encouraging and developing scientific research in the fields of static mechanics in general, and studying and analyzing loads (such as forces, torques and rotations) in physical systems in a state of static equilibrium.
4. Preparing a stimulating environment for faculty members to develop them

knowledge and educational and research skills.

5. Building and developing partnerships with the governmental and private sectors

Model 3			
Code	Course/Module Title	ECTS	Year /Semester
ME113	Principles of Production Engineering	6	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	93	57
Description			
After completing this course, students should be able to do the following: 1- Cite sources of engineering materials. 2- Explain the principles of production processes and how the type of engineering material and the procedure used for making specific products can be selected. 3- Define engineering stress and engineering strain. 4- Define mechanical properties of materials such as tensile strength, ductility, toughness, and hardness. 5- Name and describe hardness testing techniques. 6- Name and describe the two impact fracture testing techniques. 7- Explain the different types of metal production processes and their performance. 8- Describe recrystallization in terms of both the alteration of microstructure and mechanical characteristics of the material.			

- 9- Identify various manufacturing processes and conduct some calculations about finding the force and power of some metal forming processes such as rolling and extrusion.
- 10- Name and briefly describe some of the important types of welding processes.
- 11- Name and describe forming operations used to shape polymers and ceramics.

Model 4

Code	Course/Module Title	ECTS	Year /Semester
ENG126	Chemistry	3	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	42

Description

After completing this course, students should be able to do the following:

- 1- Knowledge of Atomic Structure and Bonding: Understand the structure of atoms, electronic configurations, chemical bonding, and hybridization, which form the basis for understanding the behavior of chemical substances.
- 2- Understanding of Radioactivity and Nuclear Chemistry: Explore the principles of radioactivity, nuclear stability, radioactive decay, and applications of nuclear chemistry in tracers, dating, and power sources.
- 3- Knowledge of Cement Chemistry: Study the chemistry of cement, including electrochemical corrosion, hydration reactions, and cement weathering.
- 4- Understanding of Thermal Chemistry and Chemical Kinetics: Learn about exothermic and endothermic reactions, the heat of formation, fuel and water

gas, rocket propulsions, energy, and collision. Study the kinetics of chemical reactions and the factors that influence reaction rates.

- 5- Knowledge of Acids and Bases: Gain an understanding of the chemistry of acids and bases, including water treatments, dissociation constants, acid and base strength, pH scale, sterilization, clarification, and boiler feed water.
- 6- Understanding of Petroleum Refining: Explore the chemistry involved in petroleum refining, including boiling point diagrams and processes for separating and processing hydrocarbons.
- 7- Knowledge of Hydrocarbons and Aromatic Compounds: Study the structure of benzene, homologs of benzene, reactions involving benzene substitution, as well as alcohol synthesis, ester formation, and reactions of phenols.

Overall, these modules aim to provide students with a comprehensive understanding of key concepts and principles in chemistry relevant to mechanical engineering. This knowledge will enable students to apply chemical principles in analyzing and solving engineering problems, understand materials and their properties, and make informed decisions about chemical processes and reactions in mechanical engineering applications.

Model 5

Code	Course/Module Title	ECTS	Year /Semester
ENG128	Engineering Drawing	7	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	82
Description			
After completing this course, students should be able to do the following:			
1- To learn the rules and fundamentals of engineering drawing.			

- 2- Knowledge of engineering drawing tools and how to use them.
- 3- Learn to read and write notes on engineering drawings.
- 4- To learn how to create 2D projections from 3D drawings.
- 5- To be able to read and write drawing measurements.
- 6- The ability to draw 3D shapes.
- 7- The ability to draw engineering sections.

Model 6

Code	Course/Module Title	ECTS	Year /Semester
UOM116	English Language I	2	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17

Description

After completing this course, students should be able to do the following:

- 1- This module aims to improve the technical English language skills of students in the field of petroleum engineering. The primary focus will be on developing proficiency in reading, writing, speaking, and listening to technical content related to petroleum engineering. This module will also provide an understanding of the specific language used in the field and how to communicate effectively with other professionals.

Model 7			
Code	Course/Module Title	ECTS	Year /Semester
UOM117	Democracy and Human Rights	2	1/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
After completing this course, students should be able to do the following: 1- Students understand the principles of democracy and its importance in achieving justice and sustainable development. 2- Students gain basic knowledge of international charters and conventions related to human rights and become familiar with their fundamental rights as well as the rights of others. 3- Students learn how to think critically and analytically about issues of democracy and human rights and how to evaluate evidence and positions related to these issues. 4- Students learn to actively participate in political and social life by voting in elections, participating in peaceful demonstrations, or working in non-governmental organizations. 5- Students learn the values of coexistence and mutual respect among individuals, regardless of their cultural, religious, or gender differences. They also acquire the ability to empathize and interact positively with others. 6- Students learn how to contribute to social change and combat discrimination, injustice, and oppression, whether locally or globally. 7- Students become familiar with legal procedures related to human rights protection and relevant legal issues and acquire the ability to apply legal knowledge in their daily lives.			

Model 8			
Code	Course/Module Title	ECTS	Year /Semester
ENG124	Mathematics II	5	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62
Description			
After completing this course, students should be able to do the following: Mathematics contributes to the core of engineering and serves as a source of knowledge from which engineering students can draw from. Thus, engineering students must have the ability to apply mathematical knowledge and skills to problem-solving and engineering design tasks. Simply having mathematical or engineering knowledge without understanding how to use the learned strategies can limit a student's ability to provide correct answers.			

Model 9			
Code	Course/Module Title	ECTS	Year /Semester
ME122	Mechanical Engineering Dynamic	8	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
6	2	123	77
Description			
After completing this course, students should be able to do the following:			

The theoretical foundations of Engineering Mechanics Dynamics have expanded substantially in recent years. This course aims to introduce students to this fundamental area of Engineering Mechanics Dynamic, which enables students to focus on the Kinematics of Particles. The course exposes students to the concepts of position, velocity, and acceleration and helps them determine the motion of particles, several particles, and dependent motions. The course introduces the basics of Newton's Second Law in Rectangular Components and Tangential and Normal Components, Energy and Momentum Methods, and PRINCIPLE OF WORK AND ENERGY, ENERGY, and CONSERVATION OF ENERGY. Upon completion of this course, the students are expected to become proficient in Engineering Mechanics Dynamic and to have the opportunity to explore the current topics in this area.

Model 10

Code	Course/Module Title	ECTS	Year /Semester
ENG123	Engineering Workshop	2	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	2	33	17

Description

After completing this course, students should be able to do the following:

- 1- Identify some of the reasons why machining is commercially and technologically important.
- 2- Name the three most common machining processes.
- 3- Cite the two basic categories of cutting tools in machining.
- 4- List the various operations which may be performed on a center lathe.
- 5- Describe some methods of taper-turning on a center lathe.
- 6- Describe the various kinds of drilling machines.
- 7- Describe a horizontal milling machine.

- 8- Explain the difference between peripheral milling and face milling.
- 9- Describe the cylindrical grinding operation and give an idea of the grinding wheel and work speeds recommended.
- 10- Describe the surface grinding operations with the disc as well as cup-type wheels.
- 11- Distinguish between fusion and pressure welding processes.
- 12- Describe the arc welding process.
- 13- Describe the principle of oxyacetylene gas welding.
- 14- Distinguish between welding, brazing, and soldering.
- 15- Cite the requisite properties in a good foundry sand.
- 16- Describe the procedure of making a mold with a two piece split pattern.
- 17- Enumerate some common casting defects and explain the reasons which cause these defects.
- 18- Explain the difference between open and closed die forging techniques.

Model 11

Code	Course/Module Title	ECTS	Year /Semester
ENG125	Physics	4	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		48	52

Description

After completing this course, students should be able to do the following:

- 1- To provide an understanding of the behavior of fluids at rest, including topics such as liquid pressure, pressure measurement, surface tension, Bernoulli's equation, viscosity, and the effects of turbulence. Students will learn how to apply these concepts to practical engineering applications.

- 2- To introduce students to the properties of solids, including crystalline structures, stress and strain analysis, elasticity and plasticity, and the behavior of materials under different loading conditions. Students will learn about concepts such as elasticity modulus, Poisson's ratio, and the energy stored in stressed bodies. Acquire knowledge and skills in the measurement and analysis of physical quantities, including the use of appropriate instruments and units.
- 3- To familiarize students with temperature measurement techniques and the thermal properties of materials. Topics covered may include different types of thermometers, thermal expansion of materials, thermal impedance, and phase transformations in materials due to temperature changes.
- 4- Focuses on the study of motion, including the equations of motion, simple harmonic motion (such as pendulums), damped motion, forced motion, and wave motion. Students will learn how to analyze and solve problems related to these types of motion.
- 5- To provide an understanding of sound waves, including their power and intensity, the relationship between sound and temperature, and the Doppler phenomenon. Students will learn about the properties and behavior of sound waves in different media.

Model 11

Code	Course/Module Title	ECTS	Year /Semester
ME125	Electrical Engineering	5	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	32
Description			
After completing this course, students should be able to do the following:			

A-The module aims are:

- 1- - Identify the basic symbols and terminology of electrical engineering.
- 2- - Learn the basics of DC circuits.
- 3- - Know how to use analysis methods.
- 4- - Knowledge of electrical network theories.
- 5- - Learn to solve electrical circuits using analysis methods and network theories.

B- Skill objectives of the course

- 6- - Learn to solve problems related to electrical circuits.
- 7- - Learn about the use of advanced scientific computers.
- 8- - Learn how to use the shortest solutions in electrical engineering.
- 9- - Learn how to find solutions to engineering problems using analysis methods.

Model 12

Code	Course/Module Title	ECTS	Year /Semester
UOM122	Computer I	3	1/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12

Description

After completing this course, students should be able to do the following:

- 1- Understand the fundamental concepts of computer systems and information technology.
- 2- Identify the hardware and software components of a computer system and explain their functions.
- 3- Develop basic computer operating skills using the Windows operating system.

- 4- Manage files and folders efficiently using the operating system.
- 5- Develop students' skills in using word processing applications and creating tables for preparing academic documents.
- 6- Apply computer applications to support academic and engineering tasks.
- 7- Promote effective and responsible use of computer technology in education and professional practice.

Model 13

Code	Course/Module Title	ECTS	Year /Semester
UOM123	Arabic Language I	2	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
After completing this course, students should be able to do the following: 1- Teaching students to write Arabic in a style free of spelling errors. 2- Enabling them to write administrative orders proficiently and in a simple style.			

Model 14			
Code	Course/Module Title	ECTS	Year /Semester
ENG201	Mathematics III	4	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	37
Description			
After completing this course, students should be able to do the following: 3- Be educated on Mathematics methods. 4- Know the procedure of calculations. 5- Develop students' understanding of useful Mathematics methods in engineering calculations. 6- Studying and solving applications using Mathematics.			

Model 15			
Code	Course/Module Title	ECTS	Year /Semester
ME212	Fluid Statics	5	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	77
Description			
After completing this course, students should be able to do the following:			

The overall objectives of a fluid mechanics course are to give students a solid foundation in the fundamentals of fluid mechanics, problem-solving skills, practical knowledge, and a mindset for further learning and using fluid mechanics in diverse engineering situations.

Model 16

Code	Course/Module Title	ECTS	Year /Semester
ME213	Thermodynamics I	4	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52

Description

After completing this course, students should be able to do the following:

- 1- To provide students with the ability to integrate the principles of classical thermodynamics and fluid mechanics to provide a foundation for the subsequent analysis of industrial plants and process equipment.
- 2- To ensure all students can approach thermodynamic analysis of systems logically and methodologically.
- 3- To know thermodynamics's fundamentals, concepts, and terminologies.
- 4- To understand the laws of thermodynamics and appreciate their consequences.
- 5- To develop elementary analysis skills using thermodynamics' first and second laws.

Model 17			
Code	Course/Module Title	ECTS	Year /Semester
ME214	Mechanics of Material	5	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
After completing this course, students should be able to do the following: 1- The main objective of studying the mechanics of materials is to provide the engineer with the means of analyzing and designing various machines and load-bearing structures. 2- Explain how materials react to various types of stress under multiple conditions. 3- As the engineering design of different components, structures, etc., used in practice is done using various kinds of materials, it is essential to understand the fundamental behavior of such materials			

Model 18			
Code	Course/Module Title	ECTS	Year /Semester
ME215	Mechanical Drawing	6	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	57
Description			
After completing this course, students should be able to do the following: 1- Be educated on developing an understanding of and appreciation of Technical Drawing Industrial Society;			

- 2- Discover and develop their talents in the fields of Technical Drawing and related technologies;
- 3- Develop technical problem-solving skills in Technical Drawing as related to materials and processes;
- 4- Develop the correct and accepted Technical Drawing skills as demanded by Industry;
- 5- Be aware of the career opportunities available in Technical Drawing and its related fields;
- 6- have a working knowledge and understanding of Computer Aided Drafting applications;
- 7- Develop skills to use drawing in the process of design.

Model 19

Code	Course/Module Title	ECTS	Year /Semester
ME216	Programming of Computers	6	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	108	42

Description

After completing this course, students should be able to do the following:

The course provides a gentle introduction to the MATLAB computing environment and is intended for beginning users and those looking for a review. It is designed to give students a basic understanding of MATLAB, including popular toolboxes. The course consists of interactive lectures and sample MATLAB problems, which are presented as assignments and discussed in class. No prior programming experience or knowledge of MATLAB is assumed. Concepts covered include essential use, graphical representations, and tips for designing and implementing MATLAB code.

Model 20			
Code	Course/Module Title	ECTS	Year /Semester
UOM123	Arabic Language II	2	2/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			
After completing this course, students should be able to do the following: 1- Teaching students to write Arabic in a style free of spelling errors. 2- Enabling them to write administrative orders proficiently and in a simple style.			

Model 21			
Code	Course/Module Title	ECTS	Year /Semester
ENG202	Mathematics IV	4	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	37
Description			
After completing this course, students should be able to do the following: The course provides a gentle introduction to the MATLAB computing environment and is intended for beginning users and those looking for a review. It is designed to give students a basic understanding of MATLAB, including popular toolboxes. The course consists of interactive lectures and sample MATLAB problems, which are presented as assignments and discussed in class. No prior programming experience or knowledge of MATLAB is assumed.			

Concepts covered include essential use, graphical representations, and tips for designing and implementing MATLAB code.

Model 22

Code	Course/Module Title	ECTS	Year /Semester
ME222	Fluid Dynamics	5	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	32
Description			
After completing this course, students should be able to do the following: The overall objectives of dynamics fluid mechanics course are to give students a solid foundation in the fundamentals of Dynamics fluid mechanics, problem-solving skills, practical knowledge, and a mindset for further learning and using fluid mechanics in diverse engineering situations			

Model 23

Code	Course/Module Title	ECTS	Year /Semester
ME223	Thermodynamics II	5	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	32
Description			

After completing this course, students should be able to do the following:

- 1- To provide students with the ability to integrate the principles of classical thermodynamics and fluid mechanics in order to provide a foundation for the subsequent analysis of industrial plant and process equipment.
- 2- To ensure all students can approach thermodynamic analysis of systems in a logical and methodological manner.
- 3- To understand the laws of thermodynamics and an appreciation of their consequences.
- 4- To develop some elementary analysis skills using the second laws of thermodynamics.
- 5- To deeply know the thermal engineering systems.

Model 24

Code	Course/Module Title	ECTS	Year /Semester
ME224	Strength of Materials	4	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52

Description

After completing this course, students should be able to do the following:

As the engineering design of different components, structures etc. used in practice are done using different kinds of materials, it is essential to understand the basic behavior of such materials.

Model 25			
Code	Course/Module Title	ECTS	Year /Semester
ME225	Engineering Metallurgy	5	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	3	108	17
Description			
After completing this course, students should be able to do the following: 1- To recognize the Mechanical properties of metals and alloys. 2- To learn the thermal equilibrium diagrams. 3- Learn about plain carbon steel and its heat treatment. 4- The types of alloy steels. 5- Understand the cast iron and non-ferrous metals and alloys. 6- Understand the polymers and their properties. 7- The corrosion types, mechanism, and damage.			

Model 26			
Code	Course/Module Title	ECTS	Year /Semester
MNS120	The crimes of the Baath regime in Iraq	2	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17
Description			

The overall objectives of Human Rights and Democracy course are to give students a solid foundation in the fundamentals of Human Rights and Democracy, problem-solving skills, practical knowledge, and a mindset for further learning and using Human Rights and Democracy in diverse community habits.

Model 27

Code	Course/Module Title	ECTS	Year /Semester
UOM201	Computer II	3	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	12
Description			
Introduce students to the concepts of modern computer networks and Internet technologies. 1- Familiarize students with the principles of electronic commerce (E-commerce) and cloud computing. 2-Introduce students to the fundamental concepts of Artificial Intelligence (AI) and its applications. 3- Develop students' skills in using Artificial Intelligence applications responsibly and effectively. 4- Increase students' awareness of the ethical and social aspects of Artificial Intelligence. 5- Prepare students to keep pace with emerging digital technologies and their applications in academic and professional environments.			

Model 28

Code	Course/Module Title	ECTS	Year /Semester
UOM202	English Language II	2	2/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2		33	17

Description

After completing this course, students should be able to do the following:

- 1- Develop students' proficiency in using English grammar accurately in academic and technical contexts.
- 2- Enhance students' reading comprehension skills through engineering texts related to Mechanical Engineering.
- 3- Equip students with technical vocabulary and terminology commonly used in engineering disciplines.
- 4- Develop students' writing skills by enabling them to produce grammatically correct sentences, coherent paragraphs, and technical responses in English.
- 5- Improve students' oral communication skills through classroom discussions, presentations, and interactive learning activities.
- 6- Enable students to use English effectively in engineering workplace environments, particularly in topics related to engineering materials, drilling machines, automotive engines, and occupational safety.
- 7- Prepare students to read, understand, and utilize technical books, manuals, research papers, and reference materials written in English.

Model 29

Code	Course/Module Title	ECTS	Year /Semester
ENG311	Engineering Analysis	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	37

Description

After completing this course, students should be able to do the following:

- 1- Apply complex variable techniques to solve engineering problems, including complex integration and conformal mappings.
- 2- Understand the properties and applications of special functions (Gamma function).
- 3- Understand the concept and properties of Fourier series representation.
- 4- Apply Fourier series to analyze periodic functions and solve engineering problems involving periodic phenomena.
- 5- Explore the properties and applications of odd and even functions.
- 6- Apply half-range series to analyze and approximate even and odd functions.
- 7- Understand the concept of complex Fourier series and its applications.
- 8- Apply half-range expansion to analyze and approximate complex periodic functions.
- 9- Gain knowledge of Fourier integration techniques and their applications in solving differential equations.
- 10- Understand the concept and properties of Laplace transformation.
- 11- Gain proficiency in Laplace transformation techniques and their applications in solving initial value problems of ordinary differential equations (ODEs).
- 12- Understand and solve ordinary differential equations using Laplace transform and D-operator.
- 13- Develop an understanding of Bessel functions and Legendre functions.

Model 30			
Code	Course/Module Title	ECTS	Year /Semester
ME312	Heat Transfer I	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52
Description			
After completing this course, students should be able to do the following: 1- Be educated on heat transfer methods. 2- Know the laws of heat transfer and their calculations. 3- Develop your understanding of heat transfer system thermal load calculations. 4- Identify the relationships that were examined. 5- Studying the applications of heat transfer 6- Identify the most important design parameters for heat transfer applications and systems.			

Model 31			
Code	Course/Module Title	ECTS	Year /Semester
ME313	Theory of Mechanism	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
After completing this course, students should be able to do the following: The student will be able to analyze: 1- The linear and angular velocities and accelerations. 2- The CAM and follower movements and design. 3- The gear terminology and stresses due to contact.			

4- The role and design of flywheels.

Model 32

Code	Course/Module Title	ECTS	Year /Semester
ME314	Internal Combustion Engines I	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22

Description

After completing this course, students should be able to do the following:

The student will be able to analyze:

- 1- Teaching of fundamentals of internal combustion engines.
- 2- Analysis of air standard cycles.
- 3- Engine operation calculations.
- 4- Description of different engines systems.
- 5- Studying The Difference between Wankel Engine and reciprocating engine

Model 33

Code	Course/Module Title	ECTS	Year /Semester
ME315	Gas Dynamics	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52

Description
After completing this course, students should be able to do the following: 1- Deriving the main and basic equations that govern the compressible flow at different flow speeds and conditions starting from thermodynamic and fluid basics. 2- Differentiating the compressible flow into four different flow conditions according to its speed 3- Applying the compressible flow conditions on variable area ducts using ideal flow conditions (isentropic flow). 4- Taking the effect of normal shock wave on the ideal compressible flow in a variable area duct. 5- Taking the effect of friction on the ideal compressible flow in a constant area duct (Fanno duct). 6- Taking the effect of adding or absorbing heat on the ideal compressible flow in a constant area duct (Rayleigh duct). 7- Analyzing the thrust power and propulsive efficiency of turbojet, turbofan, and turbo prop engines.

Model 34			
Code	Course/Module Title	ECTS	Year /Semester
ME316	Manufacturing Process	4	3/1
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	22
Description			
After completing this course, students should be able to do the following: 1- The course aims to introduce students to various advanced manufacturing and production processes. 2- Students acquire the skills required to work on production machines, metal welding and various plumbing operations.			

- 3- Introducing students to different traditional machines and comparing them with programmed ones and how to prepare different operating programs.
- 4- Ability to communicate with scientific and engineering developments.
- 5- Knowing an idea about the mechanism of orthogonal cutting and how they can withstand it.
- 6- Understanding the powder metallurgy, knowing its types, manufacturing methods, limitations and advantages.

Model 35

Code	Course/Module Title	ECTS	Year /Semester
ENG321	Numerical Analysis	4	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
After completing this course, students should be able to do the following: 1- To study numerical analysis methods and their applications in mechanical engineering. 2- To solve mechanical engineering problems with numerical analysis techniques. 3- To learn the basics of programming language and to write simple codes using MATLAB language.			

Model 36			
Code	Course/Module Title	ECTS	Year /Semester
ME322	Heat Transfer II	5	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	57
Description			
After completing this course, students should be able to do the following: 1- Be educated on heat transfer methods. 2- Know the laws of heat transfer and their calculations. 3- Develop your understanding of heat transfer system thermal load calculations. 4- Identify the relationships that were examined. 5- Studying the applications of heat transfer 6- Identify the most important design parameters for heat transfer applications and systems.			

Model 37			
Code	Course/Module Title	ECTS	Year /Semester
ME323	Theory of Machines	3	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	27
Description			
After completing this course, students should be able to do the following: 1- The linear and angular velocities and accelerations. 2- The CAM and follower movements and design. 3- The gear terminology and stresses due to contact. 4- The role and design of flywheels.			

Model 38			
Code	Course/Module Title	ECTS	Year /Semester
ME324	Internal Combustion Engines II	3	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	27
Description			
After completing this course, students should be able to do the following: 1- Teaching of engines fuels. 2- Teaching of combustion chamber phenomena (knocking, combustion, flame propagation, different flow motions). 3- Develop your understanding of Carbureting proses and Ignition system. 4- Identify the important of General combustion theory. 5- Description of different engines systems.			

Model 39			
Code	Course/Module Title	ECTS	Year /Semester
ME325	Turbo Machinery	5	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	93	32
Description			
After completing this course, students should be able to do the following: 1- Discriminating turbomachines according to different criteria; work done on or by and the direction of flow. 2- Deriving the main equations govern turbomachines form its first principles.			

- 3- Deriving different types of efficiencies and power for different types of turbomachines.
- 4- Using similarity and similitude methods to design any prototype turbomachine using the basic information from any module turbomachine under similar design conditions.
- 5- Analyzing flow over surfaces of blade of any turbomachine.
- 6- Using the data extracted from the above point to calculate the performance characteristics of any turbomachines

Model 40

Code	Course/Module Title	ECTS	Year /Semester
ME326	Electrical Machines	4	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22

Description

After completing this course, students should be able to do the following:

- 1- Discriminating turbomachines according to different criteria; work done on or by and the direction of flow.
- 2- Deriving the main equations govern turbomachines form its first principles.
- 3- Deriving different types of efficiencies and power for different types of turbomachines.
- 4- Using similarity and similitude methods to design any prototype turbomachine using the basic information from any module turbomachine under similar design conditions.
- 5- Analyzing flow over surfaces of blade of any turbomachine.
- 6- Using the data extracted from the above point to calculate the performance characteristics of any turbomachines

Model 41			
Code	Course/Module Title	ECTS	Year /Semester
ME327	Computational Fluid Dynamics	4	3/2
Class(hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	22
Description			
After completing this module, students should be able to: Understand the physical meaning of CFD problems and how to solve them numerically. Transform the differential equations using discretization methods to algebraic equations in order to make them solvable. Build a model and define all the related conditions such as: geometry, physics, equations, boundary conditions, meshes, run the model, and analyze the results using computers.			

3. Contact

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University of Misan

جامعة ميسان



Bachelor's degree (B.Sc.) in Mechanical Engineering

بكالوريوس في الهندسة الميكانيكية



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1. Mission & Vision Statement

Vision Statement

The Department of Mechanical Engineering, as a leading academic institution in the field of science, knowledge and community service, looks forward to this institution, and its graduates being among the pioneers of the progress and prosperity of our country by providing engineering programs and services to the community in accordance with international standards of comprehensive quality.

Mission Statement

The Department of Mechanical Engineering seeks to prepare successful engineering cadres armed with science and values to advance the scientific and cognitive reality of society and develop it according to a renewed and distinguished scientific academic system, and to provide it with a generation of conscious and empowered youth in modern concepts and skills with inspiration from the civilizational and Islamic heritage of Iraq.

2. Program Specification

Programme code:	BSc-Mechanical Engineering	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Mechanical engineering science is a wonderfully wide-ranging subject. The focus of the program is on everything related to the mechanical engineering, whether it is power or applied mechanics. The degree is popular or some it is the breadth of the subject that appeals, for others it is a path to specialization. All students have the opportunity to transfer onto our specialist degrees in mechanical engineering at the end of the first year.

Level 1 exposes students to the fundamentals of mechanical engineering, suitable for progression to all programs within the mechanical engineering program group. Program-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. A Leeds mechanical engineering graduate is therefore trained to appreciate how research informs teaching, according to the university mission statements.

At Levels 2, 3, and 4, students are free to choose more than half of their module credits with the proviso a range of modules are selected that reflect the complexity of the mechanical engineering to ensure the breadth of knowledge expected of a graduate with the mechanical engineering degree. This allows students to develop their own wide-ranging interests in mechanical engineering. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practicals, either embedded in lecture modules or taught in dedicated practical modules, research seminars, and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3, and 4. At Level 4 all students carry out an independent research project, which deals with theoretical or experimental studies in the fields of power or applied mechanics under the supervision of professional supervisory teams.

Academic tutorials are held at all levels with tutors who provide continuity and progressive guidance. All levels include a number of workshops to teach skills, e.g., use of library and presentation skills, followed by assessed exercises, e.g., essays and talks, as opportunities to practice these skills in a subject-specific context.

3. Program Objectives

1. Providing the community with specialized engineering expertise and competencies in mechanical engineering by raising the level of graduates in terms of knowledge, skills, and research.
2. Creating a university environment that stimulates the capabilities of university professors and students and encourages qualitative scientific productivity.

3. Developing scientific, research, professional and educational capacities, and capabilities to reach a state of competition at the local and international levels.
4. Developing the administrative and scientific work system in the department, which makes it productive.
5. Integration between educational outputs and the labor market should be achieved in order to form a solid scientific basis for solving industrial and service problems in the country.
6. Opening up to society locally, in the Arab world, and globally and enhancing communication for the purpose of achieving the desired goals.

4. Student Learning Outcomes

These student learning outcomes in Mechanical Engineering ensure that graduates are well-prepared to contribute to designing, developing, and operating mechanical systems in diverse industries such as automotive, aerospace, energy, manufacturing, and robotics.

Outcome 1

Technical Competence

Mechanical Engineering students will develop a strong foundation in core engineering principles and acquire technical expertise in thermodynamics, mechanics, materials science, and control systems. They will demonstrate proficiency in applying this knowledge to solve complex engineering problems.

Outcome 2

Design and Innovation

Students will gain the skills to design and innovate mechanical systems and components. They will be able to analyze requirements, develop conceptual designs, and apply engineering principles to create efficient, reliable, and sustainable solutions.

Outcome 3

Experimental and Analytical Skills

Mechanical Engineering students will develop the ability to conduct experiments, analyze data, and draw meaningful conclusions. They will utilize laboratory equipment and computational tools to evaluate the performance of mechanical systems and validate design solutions.

Outcome 4

Teamwork and Communication

Students will work effectively in multidisciplinary teams, demonstrating collaboration, leadership, and effective communication skills. They will be able to contribute constructively to group projects, present technical information clearly, and collaborate with professionals from diverse backgrounds.

Outcome 5

Professional Ethics and Responsibility

Mechanical Engineering graduates will understand their profession's ethical and professional responsibilities. They will adhere to high standards of integrity, demonstrate awareness of environmental and societal impacts, and prioritize safety and sustainability in their engineering practices.

Outcome 6

Lifelong Learning and Adaptability

Students will develop a mindset of continuous learning and adaptability to evolving technologies and industry trends. They will engage in professional development activities, stay updated with advancements in the field, and possess the skills to adapt to new challenges and technologies throughout their careers.

5. Academic staff

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6. Credits, Grading and GPA

Credits

Misan University/College of Engineering follows 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 hours of student workload, 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	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 المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number 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 Cumulative Grade Point Average (CGPA)

- The CGPA is calculated by multiplying each module score by its ECTS and dividing the result by the program's total ECTS.

CGPA of a 4-year B.Sc. degree:

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

7. Curriculum/Modules

Semester 1| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENG122	Mathematics I	63	62	5	B	
ME112	Static Engineering Mechanics	78	47	5	C	
ME113	Principles of Production Engineering	93	57	6	C	
ENG126	Chemistry	33	42	3	S	
ENG128	Engineering Drawings	93	82	7	B	
UOM120	English Language	33	17	2	B	
UOM121	Democracy and Human Rights	17	50	2	S	

Semester 2| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENG124	Mathematics II	63	62	5	B	Mathematics I
ME122	Dynamic Engineering Mechanics	123	102	9	C	
ENG123	Workshop Technology	33	17	2	B	
ENG125	Physics	33	42	3	S	
ME125	Electrical Engineering	78	47	7	S	
ENG127	Computer Fundamental and Programming	123	52	4	B	

Semester 3| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENG201	Mathematics III	63	37	4	B	
ME212	Fluid Statics	48	77	5	C	
ME213	Thermodynamics I	48	52	4	C	
ME214	Mechanics of Materials	78	47	5	C	
ME215	Mechanical Drawing	93	57	6	C	
ME216	Programming of Computers	108	42	6	B	

Semester 4| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ENG202	Mathematics IV	63	37	4	B	Mathematics III
ME222	Fluid Dynamics	78	47	5	C	
ME223	Thermodynamics II	78	47	5	C	
ME224	Strength of Materials	48	52	4	C	
ME225	Engineering Metallurgy	78	47	5	C	
UOM201	Computer II	63	17	3	B	
UOM202	Technical English	33	17	2	B	
MNS120	Crimes of the Baath regime in Iraq	33	17	2	B	

Semester 5| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
E311	Engineering Analysis	63	62	5	B	
ME312	Heat Transfer I	48	52	4	C	
ME313	Theory of Mechanism	93	32	5	C	
ME314	Internal Combustion Engines I	93	32	5	C	
ME315	Gas Dynamics	48	52	4	C	
ME316	Manufacturing Process	108	67	7	C	

Semester 6| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
E321	Numerical Analysis	78	47	5	B	
ME322	Heat Transfer II	93	57	6	C	
ME323	Theory of Machines	48	27	3	C	
ME324	Internal Combustion Engines II	48	27	3	C	
ME325	Turbo Machinery	93	57	6	C	
ME326	Electrical Machines	108	67	7	S	

Semester 7| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ME411	Design of Machine Elements I	108	67	7	C	
ME412	Power Plant	123	77	8	C	
ME413	Theory of Vibrations	48	27	3	C	
ME414	Control	48	27	3	C	
ME415	Engineering Materials	63	62	5	C	

ME416	Engineering Project	78	22	4	S	
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Semester 8| 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
ME421	Design of Machine Elements II	63	62	5	C	
ME422	Air Conditioning and Refrigeration	123	52	7	C	
ME423	Vibration Applications	93	32	5	C	
ME424	Measurements	78	47	5	C	
ME425	Industrial Engineering	63	62	5	S	
ME416	Engineering Project (continued)	48	27	3	S	

8. **Contact**

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		جامعة ميسان					University of Misan													
		مستوى البكالوريوس (الدورة الأولى) - بكالوريوس مع مرتبة الشرف في الهندسة الميكانيكية					Bachelor's level (First cycle) - Honors Bachelor degree in Mechanical Engineering													
		أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة أوروبية - كل وحدة أوروبية = ٢٥ ساعة					Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25hr													
		المنهاج الدراسي للعام ٢٠٢٣ - ٢٠٢٤					Program Curriculum (2023 - 2024)													
Prerequisite Module(s)	Module Type	ECTS	SWL hr/sem	USSWL hr/sem	SSWL hr/sem	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	Level		
							Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)	CL (hr/w)								
	B	5	125	62	63	3		1				3	English	الرياضيات I	Mathematics I	ENG 122	1	One		
	C	5	125	47	78	3		1				4	English	الميكانيك الهندسي المكوني	Static Engineering Mechanics	ME112	2			
	C	6	150	57	93	3			2			4	English	مبادئ هندسة الإنتاج	Principles of Production Engineering	ME113	3			
	S	3	75	42	33	3						2	English	الكيمياء	Chemistry	ENG126	4			
	B	7	175	82	93	3			4			2	English	الرسم الهندسي	Engineering Drawings	ENG128	5			
	B	2	50	17	33	3						2	English	اللغة الانكليزية I	English Language I	UOM116	6			
	S	2	50	17	33	3						2	Arabic	الديمقراطية وحقوق الانسان	Democracy and Human Rights	UOM117	7			
		30	750	324	426	21		2	6			19	Total							
Prerequisite Module(s)	Module Type	ECTS	SWL hr/sem	USSWL hr/sem	SSWL hr/sem	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	UG1		
							Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)	CL (hr/w)								
	B	5	125	62	63	3		1				3	English	الرياضيات II	Mathmatics II	ENG124	1	Two		
	C	8	200	77	123	3		2				6	English	الميكانيك الهندسي الحركي	Dynamic Engineering Mechanics	ME122	2			
	B	2	50	17	33	3			2				English	الورش الهندسية	Engineering Workshops	ENG123	3			
	S	4	100	52	48	3						3	English	الفيزياء	Physics	ENG125	4			
	S	5	125	32	93	3	1		1	2		2	English	الهندسة الكهربائية	Electrical Engineering	ME125	5			
	B	3	75	12	63	3				2		2	English	الحاسوب I	Computer I	UOM122	6			
	B	2	50	17	33							2	Arabic	اللغة العربية I	Arabic language I	UOM	7			
		29	725	269	423	18		3	3	4		18	Total							
Prerequisite Module(s)	Module Type	ECTS	SWL hr/sem	USSWL hr/sem	SSWL hr/sem	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	Level		
							Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)	CL (hr/w)								
	B	4	100	37	63	3		1				3	English	رياضيات III	Mathmatics III	ENG201	1	One		
	C	5	125	77	48	3		1				2	English	ميكانيك الموائع الساكنة	Fluid Statics	ME212	2			
	C	4	100	52	48	3		1				2	English	ديناميك الحرارة I	Thermodynamics I	ME213	3			
	C	5	125	47	78	3		1		2		2	English	ميكانيك المواد	Mechanics of Materials	ME214	4			
	C	6	150	57	93	3			4			2	English	الرسم الميكانيكي	Mechanical Drawing	ME215	5			
	B	6	150	42	108	3				3		4	English	برمجة الحاسبات	Programming of Computers	ME216	6			
	B	2	50	17	33							2	Arabic	اللغة العربية II	Arabic language II	UOM	7			
		32	750	312	438	18		4	4	5		15	Total							
Prerequisite Module(s)	Module Type	ECTS	SWL hr/sem	USSWL hr/sem	SSWL hr/sem	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	UG2		
							Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)	CL (hr/w)								
	B	4	100	37	63	3		1				3	English	رياضيات IV	Mathmatics IV	ENG202	1	Two		
	C	5	125	32	93	3		1		3		2	English	ميكانيك الموائع المتحركة	Fluid Dynamics	ME222	2			
	C	5	125	32	93	3		1		3		2	English	ديناميك الحرارة II	Thermodynamics II	ME223	3			
	C	4	100	52	48	3		1				2	English	مقاومة المواد	Strenght of Materials	ME224	4			
	C	5	125	17	108	3				3		4	English	المعادن الهندسية	Engineering Metallurgy	ME225	5			
	S	2	50	17	33	3						2	Arabic	جرائم نظام البعث في العراق	The crimes of the Baath regime in Iraq	MNS120	6			
	B	3	75	42	33	3						2	English	الحاسوب II	Computer II	UOM201	7			
	B	2	50	17	33	3						2	English	اللغة الانكليزية II	English Language II	UOM202	8			
		30	625	246	438	24		4		9		19	Total							
Prerequisite Module(s)	Module Type	ECTS	SWL hr/sem	USSWL hr/sem	SSWL hr/sem	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	Level		
							Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)	CL (hr/w)								
	B	4	100	37	63	3		1				3	English	التحليلات الهندسية	Engineering Analysis	ENG311	1	One		
	C	5	125	77	48	3		1				2	English	انتقال الحرارة I	Heat Transfer I	ME312	2			
	C	5	125	47	78	3		1		2		2	English	نظرية الالات	Theory of Mechanism	ME313	3			
	C	5	125	47	78	3		1		2		2	English	محركات الاحتراق الداخلي I	Internal Combustion Engines I	ME314	4			
	C	4	100	52	48	3		1				2	English	دينامك الغازات	Gas Dynamics	ME315	5			
	C	5	125	47	78	3				2		3	English	عمليات التصنيع	Manufacturing Process	ME316	6			
		28	700	307	393	18		5		6		14	Total							

Prerequisite Module(s)	Module Type	ECTS	SWL	USSWL	SSWL	Exam hr/sem	SSWL (hr/w)					Language	اسم المادة الدراسية	Module Name in English	Module Code	No.	Semester	UG3
			hr/sem	hr/sem	hr/sem		Semn (hr/w)	Tut (hr/w)	Pr (hr/w)	Lab (hr/w)	Lect (hr/w)							
	B	4	100	22	78	3		1		2		2	English	التحليلات العددية وتطبيقاتها	Numerical Analysis andApplications	ENG321	1	
	C	5	125	32	93	3		1		3		2	English	انتقال الحرارة II	Heat Transfer II	ME322	2	
	C	3	75	27	48	3		1				2	English	نظرية المكائن	Theory of Machines	ME323	3	
	C	3	75	27	48	3		1				2	English	محركات الاحتراق الداخلي II	Internal Combustion Engines II	ME324	4	
	C	5	125	32	93	3		1		3		2	English	المكائن التوربينية	Turbo Machinery	ME325	5	
	S	4	100	22	78	3		1		2		2	English	المكائن الكهربائية	Electrical Machines	ME326	6	
	C	4	100	22	78					3		2	English	ديناميك الموائع الحاسوبي	Computational Fluid Dynamics	ME327	8	
		28	700	184	516	18		6		10		12	Total					
Note: The student should complete 4 weeks of Summer Internships to fullfil the requirements of the Bachelor of Science degree																		
			Student Workload			SWL:			Basic learning activities			B	Module type		Class Lecture		CL	Structured SWL (hr/w) type
			Structured SWL			SSWL:			Core learning activity			C			Laboratory		Lab	
			Unstructured SWL			USSWL:			Suport or related learning activity			S			Practical Training		Pr	
									Elective learning activity			E			Tutorial		Tut	
														Online lecture Seminar		Lect		



Semester one

Semester one	Mathematics I	ENG122
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics I		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG122		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Sameer F. Hamad	e-mail	Sfhamad4@uomisan.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	23/06/2023	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 and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Mathematics contributes to the core of engineering and serves as a source of knowledge from which engineering students can draw from. Thus, engineering students must have an ability to apply mathematical knowledge and skills to problem solving and engineering design tasks. Simply having mathematical or engineering knowledge without understanding of how to apply the learned strategies can limit a student's ability to provide correct answer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students after passing this course will be able to understand the basic mathematics principles and having the ability to deal with various derivative problems which makes him eligible to understand new more complicated topics.
Indicative Contents المحتويات الإرشادية	



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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	2-11	All
	Assignments	5	5% (5)	2-12	All
	Home work	10	10% (10)	4-13	All
	Report	--	--	--	--
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	The definition of functions, Domains, and Ranges
Week 2	Sums, differences, products, quotients composition of functions
Week 3	The absolute value function
Week 4	The graph of functions
Week 5	The trigonometric functions. The graph of the functions
Week 6	The inverse of trigonometric functions
Week 7	The Limits and Continuity Calculating Limits Using the Limit Laws, Properties of Limits, Limits of Trigonometric Function, Special Trigonometric Limits
Week 8	Limit involving infinity



Week 9	Continuous functions
Week 10	Differentiation: The definition of derivative. Rules for Differentiating Functions
Week 11	Implicit Differentiation and the higher derivatives
Week 12	Derivatives of trigonometric functions
Week 13	The chain rule
Week 14	Hyperbolic functions, Exponential Functions, Rules and Properties of the Exponential Functions, The Derivative and Integration of Exponential Function, The Exponential Function for Bases other Than (e) (a^x and $\log_a x$), Derivative and Integration the Exponential Function.
Week 15	Integration The Definite Integral, Basic Integration Rules, Integration of Trigonometric Functions, The Area under the Curve, The Natural Logarithmic Function, The Derivative and Integration of Natural Logarithmic Function.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus, G B. Thomas, R.L.Finney, M.D. Weir, Addison-Wesley; 12 th Edition, 2010	Yes
Recommended Texts		
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 المعالجة)	(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.



Semester one	Static Engineering Mechanics	ME112
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanical Engineering Static		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME112		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Firas Lattef Hussany	e-mail	firaslattef@uomisan.edu.iq
Module Leader's Acad. Title	Assist. Lect.	Module Leader's Qualification	Master
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى



Prerequisite module	Mechanical engineering Dynamic	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Preparing and qualifying specialized engineers to meet the requirements of the labor market in its private and public sectors in static mechanics through diversifying the methods of learning and teaching and training students to apply the acquired knowledge and skills to solve real problems. 2. Providing distinguished academic programs in the field of static mechanics, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market. 3. Encouraging and developing scientific research in the fields of static mechanics in general, and studying and analyzing loads (such as forces, torques and rotations) in physical systems in a state of static equilibrium. 4. Preparing a stimulating environment for faculty members to develop their knowledge and educational and research skills. 5. Building and developing partnerships with the governmental and private sectors
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: A- Knowledge and Understanding a) Practice the basic skills of analyzing simple mechanical systems. b) acquire skills in analyzing mechanical systems that are in a constant



	state of equilibrium c) acquire basic skills in focusing on a free body diagram and on choosing an appropriate coordination system B. Subject-specific skills a. Ability to analyze mechanical systems. b. The ability to think about addressing a particular problem or issue. c. Solve mechanical problems. d. The ability to gain experience in dealing with mechanical systems
Indicative Contents المحتويات الإرشادية	• Readings, self-learning, panel discussions. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit and develop capabilities. • Conduct seminars to explain and analyze a specific issue and find solutions to it.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Readings, self-learning, panel discussions. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit and develop capabilities

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5



Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6, 7 and 13
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	LO # 5, 11 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المناهج الاسبوعي النظري	
	Material Covered
Week 1	Fundamental Concepts of static Composition and Resolution of forces
Week 2	Resolution of forces in space
Week 3	Couple and moment Transformation of a couple, Resolution of a force into a force and couple



Week 4	Resultant of Forces system
Week 5	Resultant of a Concurrent Non-Coplanar Force
Week 6	Free Body Diagrams (F.B.D)
Week 7	equilibrium
Week 8	Trusses
Week 9	Friction part 1
Week 10	Friction part 2
Week 11	Centroids and Centers of Gravity by Integration
Week 12	Centroids and Centers of Gravity of Composite Area and Bodies
Week 13	Second Moments or Moments of Inertia
Week 14	second moments of Areas by Integration
Week 15	Moments of Inertia of Composite Area
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Higdon. 2- Meriam .	Yes
Recommended Texts	1-Hibbeler. 2- Beer .	yes
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 المعالجة)	(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.



Semester one	Principles of Production Engineering	ME113
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of Production Engineering		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ME113		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Dr. Mohammed Razzaq Mohammed	e-mail	mohammedrazzaq14@uomisan.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	18/06/2023	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 and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	After completing this course, students should be able to do the following: • Cite sources of engineering materials. • Explain the principles of production processes, and how the type of engineering material and the procedure used for making specific product can be selected. • Define engineering stress and engineering strain. • Define mechanical properties of materials such as tensile strength, ductility, toughness and hardness. • Name and describe hardness testing techniques. • Name and describe the two impact fracture testing techniques. • Explain the different types of metal production processes and their performance. • Describe recrystallization in terms of both the alteration of microstructure and mechanical characteristics of the material. • Identify various manufacturing processes and conduct some calculations about finding force and power of some metal forming processes such as rolling and extrusion. • Name and briefly describe some of important types of welding processes. • Name and describe forming operations that are used to shape polymers and ceramics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is that graduate mechanical engineer can deal with methods, applications, problems, calculations and design related to engineering materials, manufacturing processes and welding technology.
Indicative Contents المحتويات الإرشادية	Introduction to principle production engineering, evaluating the materials extraction and production, manufacturing processes and welding.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	2, 12	All
	Projects / Lab.	1	10% (10)	Continuous	All



	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Engineering Materials, Mechanical Properties of Materials
Week 2	Extraction and Production of Ferrous Metals: Production of iron and steel
Week 3	Extraction and Production of Non-Ferrous Metals: Production of Aluminum, Copper and Zinc
Week 4	Metal Forming Processes
Week 5	Hot and Cold Working Processes
Week 6	Rolling/ Types of Rolling Mills
Week 7	Flat Rolling and Its Analysis
Week 8	Extrusion Processes, Analysis of Extrusion
Week 9	Wire and Tube Drawing
Week 10	Deep Drawing
Week 11	Welding Processes/ Fusion welding and Pressure welding
Week 12	Gas Welding Process, Arc Welding and Electric Resistance Welding
Week 13	Polymer Forming Techniques
Week 14	Plastic Forming Techniques
Week 15	Ceramic Forming Techniques



Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Mechanical Properties of Materials
Week 2	Lab 2: Tension Test
Week 3	Lab 3: Hardness Test
Week 4	Lab 4: Impact test
Week 5	Lab 5: Metal Forming Processes: Rolling
Week 6	Lab 6: Extrusion Processes
Week 7	Lab 7: Drawing Processes
Week 8	Lab 8: Wire Drawing
Week 9	Lab 9: Tube Drawing
Week 10	Lab 10: Deep Drawing
Week 11	Lab 11: Welding Processes - Fusion welding
Week 12	Lab 12: Welding Processes - Pressure welding
Week 13	Lab 13: Plastic Forming Techniques
Week 14	Lab 14: Ceramic Forming Techniques
Week 15	Lab 15: Final examination



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Materials Science and Engineering an Introduction, William D. Callister, JR. and David G. Rethwisch.	No
Recommended Texts	Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover.	No
Websites	YOUTUBE	

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 المعالجة)	(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.



Semester one	Chemistry	ENG126
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	chemistry		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG126		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Hanan hashim abid	e-mail	hananamaula@uomisan.edu.iq
Module Leader's Acad. Title	Assist lecture	Module Leader's Qualification	master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	30/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	chemistry	Semester	1
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims

أهداف المادة الدراسية

1. Knowledge of Atomic Structure and Bonding: Understand the structure of atoms, electronic configurations, chemical bonding, and hybridization, which form the basis for understanding the behavior of chemical substances.
2. Understanding of Radioactivity and Nuclear Chemistry: Explore the principles of radioactivity, nuclear stability, radioactive decay, and applications of nuclear chemistry in tracers, dating, and power sources.
3. Knowledge of Cement Chemistry: Study the chemistry of cement, including electrochemical corrosion, hydration reactions, and the weathering of cement.
4. Understanding of Thermal Chemistry and Chemical Kinetics: Learn about exothermic and endothermic reactions, the heat of formation, fuel and water gas, rocket propulsions, energy, and collision. Study the kinetics of chemical reactions and the factors that influence reaction rates.
5. Knowledge of Acids and Bases: Gain an understanding of the chemistry of acids and bases, including water treatments, dissociation constants, acid and base strength, pH scale, sterilization, clarification, and boiler feed water.
6. Understanding of Petroleum Refining: Explore the chemistry involved in petroleum refining, including boiling point diagrams and processes for separating and processing hydrocarbons.
7. Knowledge of Hydrocarbons and Aromatic Compounds: Study the structure of benzene, homologs of benzene, reactions involving benzene substitution, as well as alcohol synthesis, ester formation, and reactions of phenols.

Overall, these modules aim to provide students with a comprehensive understanding of key concepts and principles in chemistry that are relevant to mechanical engineering. This knowledge will enable students to apply chemical principles in analyzing and solving engineering problems, understanding materials and their properties, and making informed decisions related to chemical processes and reactions in mechanical engineering applications.

Module Learning Outcomes

مخرجات التعلم للمادة الدراسية

Understand the fundamental principles and concepts of chemistry, including atomic structure, chemical bonding, and chemical reactions.

Apply chemical knowledge to analyze and predict the properties and behavior of materials used in mechanical engineering, such as



	metals and composites. Demonstrate an understanding of the relationship between chemical processes and mechanical engineering applications, such as corrosion, combustion, and heat transfer. Demonstrate awareness of ethical and safety considerations in handling and working with chemical substances
Indicative Contents المحتويات الإرشادية	1. Atomic Structure and Bonding: • Atomic theory: Historical development, models of the atom (e.g., Bohr model, quantum mechanical model) • Electronic structures: Electron configuration, energy levels, orbitals • Chemical bonding: Ionic, covalent, and metallic bonding; Lewis structures; VSEPR theory • Hybridization: Hybrid orbitals, molecular geometry, hybridization in organic molecules 2. Radioactivity / Periodic Tables / Material State: • Radioactivity: Types of radiation, nuclear decay, half-life, radioactive dating • Periodic table: Periodic trends (e.g., atomic size, ionization energy, electronegativity) • Material states: Solid, liquid, gas; phase transitions; phase diagrams 3. Cement / Electrochemical Corrosion: • Cement: Hydration reactions, setting and hardening of cement, properties of concrete • Electrochemical corrosion: Galvanic cells, corrosion mechanisms, corrosion prevention techniques 4. Thermal Chemistry / Chemical Kinetics: • Exothermic and endothermic reactions: Energy changes, heat transfer, enthalpy • The heat of formation: Calculation of enthalpy changes, Hess's law • Fuel and water gas: Combustion reactions, energy content of fuels, water-gas shift reaction • Rocket propulsion: Principles of rocket engines, propellant combustion • Energy and collision: Activation energy, reaction rates, collision theory 5. Chemistry of Acids and Bases / Water Treatments:



	• Dissociation constants: Acid and base dissociation, pH, pOH • Acid and base strength: Strong and weak acids/bases, acid-base equilibrium • Water treatment: Water purification methods, disinfection techniques, water quality parameters • Boiler feed water: Water treatment for steam generation, corrosion control • Petroleum refining: Crude oil composition, refining processes (e.g., distillation, cracking) 6. Hydrocarbons, Aromatic Compounds, Alcohol: • Hydrocarbons: Alkanes, alkenes, alkynes, isomerism, reactions (e.g., combustion, addition) • Aromatic compounds: Structure of benzene, aromaticity, reactions (e.g., substitution) • Alcohol: Structure, nomenclature, synthesis, reactions, ester formation • Phenol: Properties, reactions (e.g., electrophilic aromatic substitution)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Implement active learning strategies such as problem-solving exercises, case studies, and group discussions, for students with engineering problems that require the application of chemical knowledge and skills to find solutions.



	Encourage students to analyze and solve these problems, fostering critical thinking and problem-solving abilities.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	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/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
	Quizzes	2	5% (5)	5, 10	All



Formative assessment	Assignments	2	5% (5)	2, 12	All
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2 hr	20% (20)	7	All
	Final Exam	3 hr	70% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	- Atomic Structure and Bonding - Atomic Theory - the nuclear Atoms
Week 2	- Electronic Structures - Chemical Bonding - Hybridization
Week 3	- Radioactivity - Periodic Tables - Material State
Week 4	Nuclear Stability, - Radioactive decay - Tracers - Dating - Power Sources



Week 5	• Cement • Electrochemical Corrosion • Hydration Reaction • Weathering of Cement • quiz
Week 6	• Thermal Chemistry • Chemical Kinetics • Exothermic And Endothermic Reaction
Week 7	• heat of Formation • fuel and Water gas • Rocket Propulsions • Energy and collision
Week 8	• Chemistry of acids and bases • Water Treatments • Dissociation Constants
Week 9	• The Strength of Acid and Bases • The PH Scale • Known Acid and Base
Week 10	• Sterilization • Clarification • Boiler feed Water • Boiling point Diagram Petroleum Refining • Quiz.
Week 11	• Hydrocarbons • Aromatic Compounds
Week 12	• Benzene Structure • Substitution of Benzene.
Week 13	• Homologues of Benzene • substitution in benzene ring
Week 14	• Alcohol • synthesis of Alcohol
Week 15	• Ester Formation, • reaction of Phenol
Week 16	A preparatory week before the Final Exam



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	General Chemistry: Principles and Modern Applications" by Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura, and Carey Bissonnette.	Yes
Recommended Texts	Principles of Modern Chemistry" by Oxtoby, Gillis, and Campion.	yes
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 المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A 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.



Semester one	Engineering Drawings	ENG128
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	ENG128		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mushtaq Abdul Kareem Hussein	e-mail	mushtaqkareem@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Firas Lattef Hussany	e-mail	firaslattef@uomisan.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	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 and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To learn the rules and fundamentals of engineering drawing. 2. Knowledge of engineering drawing tools and how to use them. 3. Learn to read and write notes on engineering drawings. 4. To learn how to create 2D projections from 3D drawings. 5. To be able to read and write drawing measurements. 6. The ability to draw 3D shapes. 7. The ability to draw engineering sections.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowing the tools used in engineering drawing and how to use them properly. 2. The student's ability to understand and apply the basics of engineering drawing. 3. Reading, disassembling and assembling geometric shapes through drawing, projection and cross sectional methods. 4. Developing the student's skill in using tools in drawing geometric shapes. 5. Developing the student's engineering imagination through deducing the projections and sections of each geometric solid and realizing its dimensions. 6. Communicate with the most important ideas presented by the article through Internet.
Indicative Contents المحتويات الإرشادية	1. Introduction to the subject: basics of engineering drawing and the difference between it and free drawing: Engineering drawing, its elements, tools and drawing methods.



	2. Introducing students to paper scales and drawing boards. 3. Layout the sheets (frame, table, etc.), Types of lines in engineering drawing, Rules for writing dimensions and measurements and recognizing symbols and their significance, Drawing scales (zoom in and zoom out). 4. Engineering drawing operations: Create and divide angles, Divide circles and draw regular shapes in them. Create connecting lines between arcs and circles. 5. Projection in orthogonal planes, vertical projection methods, Drop geometric shapes. 6. Drawing engineering perspectives, types of engineering perspectives and its construction from projections. 7. Distribution of projections on the drawing sheet, Conclusion of the third projection from two projections. 8. Inferring the isometric perspective from projections with dimensions. 9. Sections in engineering drawing, their importance, Non-Cut Parts, Notes on sections, types of sections and their classification. 10. Using real 3D models to help students see the 2D model drawn in the book (as a way of elucidation more acceptable to students).
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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 class training, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by
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	considering types of simple exercises involving some drawings that are interesting to the students.
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Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SSWL (h/sem)		93	Structured SSWL (h/w)		6
الحمل الدراسي المنتظم للطلاب خلال الفصل			الحمل الدراسي المنتظم للطلاب أسبوعيا		
Unstructured USSWL (h/sem)		82	Unstructured USSWL (h/w)		5
الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		175			
الحمل الدراسي الكلي للطلاب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	4, 9,12,15	LO #1- #3 and LO #4 - #8 and LO #9 - #11 and LO #12- #14
	Classwork	15	15% (15)	Continuous	Continuous
	Homework	15	15% (15)	Continuous	Continuous
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO #1- #6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Introduction to engineering drawing , Drawing tools.
Week 2	Line types, Notes on lines drawings , straight line operations.
Week 3	Circle and arc operations.
Week 4	• Polygon operations , Ellipse operation. • Quiz 1
Week 5	Tangential lines.
Week 6	Parallel projection, Orthographic projection.
Week 7	• 1st and 3rd Angles projection, Concluding 3rd projector, Notes on projections. • Midterm Exam
Week 8	Section lines, Full sections, Section planes, Half sections, Zigzag sections.
Week 9	• Partial sections , Non-cut parts, Notes on sections. • Quiz 2
Week 10	Theory of dimensions, Dimension elements, Oblique dimensions, Dimension symbols.
Week 11	Leader dimensions, Circle and angle dimensions.
Week 12	• Notes on dimensions. • Quiz 3
Week 13	Metric drawing.
Week 14	Oblique drawing.
Week 15	• Perspective drawing. • Quiz 4
Week 16	Preparatory week before the final Exam



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Systematic engineering drawing book , author Jaafar Al-Khafaf	Yes
Recommended Texts	- Luzadder, Fundamentals of Engineering Drawing, Prentice. - French, C.J. Vierck and R.J. Foster, Engineering Drawing and Graphic Technology, McGraw-Hill, 1981.	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 المعالجة)	(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.



Semester one	English Language I	UOM116
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language I		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM116		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammed Tali Qasim	e-mail	Mohammed.Almalchy@uomisan.edu.iq
Module Leader's Acad. Title	lecture	Module Leader's Qualification	Master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	2/07/2023	Version Number	1.0

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



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aims of an English: 1. Developing language skills: The primary aim of an English class is to help students develop their skills in speaking, listening, reading, and writing in English. This includes improving vocabulary, grammar, pronunciation, and comprehension abilities 2. Enhancing communication skills: English classes aim to improve students' ability to communicate effectively in English. This involves developing fluency, accuracy, and confidence in spoken and written communication. 3. Building reading and comprehension skills 4. Developing writing skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Learning outcomes in an English class refer to the specific knowledge, skills, and abilities that students are expected to achieve by the end of the course. These outcomes can be aligned with the aims of the class and can vary depending on the level and focus of the course. Here are some examples of learning outcomes for an English class: 1. Listening Skills: Demonstrate improved listening comprehension in various contexts, such as lectures, conversations, and audio recordings 2. Speaking Skills: Communicate effectively in English in both formal and informal situations. 3. Reading Skills: Read and comprehend a variety of texts, including literary works, articles, and informational materials. 4. Writing Skills: Produce well-structured, coherent, and grammatically correct written texts. 5. Language Autonomy: Take responsibility for ongoing language learning and self-improvement
Indicative Contents المحتويات الإرشادية	The main indicative contents are: Reading comprehension (2hr). Present simple, Present Continuous (2hr). Past Simple, Past Continuous (2hr). Future Simple (1hr) Future Continuous(1hr) Simple Statement(1hr) Conditional Statements (Types I, II, III),(3hr) Indirect Questions (2hr)



	Definite and Indefinite Articles (2hr) Idioms (2hr) Present Perfect (1hr). Past perfect (1hr). Passive voice (3hr). Compound and complex statement(2hr). Prepositions (2hr).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In an English class, various teaching strategies can be employed to facilitate effective language learning and achieve the desired learning outcomes. Here are some strategies commonly used in English language instruction: 1. Communicative Approach: Emphasize meaningful communication and interaction in English by engaging students in real-life situations, role-plays, discussions, and pair/group activities. 2. Language Immersion: Create an immersive environment where English is the primary language of instruction and communication, encouraging students to actively use and practice the language. 3. Task-Based Learning: Structure activities around real-life tasks that require the use of English language skills, such as problem-solving, decision-making, and project work, to promote active learning and language application. 4. Cooperative Learning: Foster collaboration and teamwork among students by assigning group projects, pair work, and cooperative tasks that promote peer-to-peer interaction and mutual support in English language practice.



Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	20% (20)	2, 12	LO # 3, 4, 6 and 7
	Projects/ Lab				
	Report				
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
Week	Material Covered
Week 1	Reading comprehension.
Week 2	- Present simple. - Present Continuous,
Week 3	Past Simple.



	• Past Continuous.
Week 4	• Future Simple
Week 5	• Future Continuous • Quiz
Week 6	• Simple Statement
Week 7	• Conditional Statements (Types I, II, III)
Week 8	• Indirect Questions
Week 9	• Definite and Indefinite Articles
Week 10	• Idioms. • Quiz.
Week 11	• Present Perfect
Week 12	• Past perfect
Week 13	• Passive voice
Week 14	• Compound and complex statement
Week 15	• Prepositions
Week 16	• Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Headway plus, John and Liz Soars	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 المعالجة)	(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.



Semester one	Democracy and human rights	UOM117
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Democracy and human rights		Module Delivery
Module Type	S		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM117		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	2
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	e-mail		
Module Leader's Acad. Title	Module Leader's Qualification		
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1-To gain an understanding of the philosophic and political backgrounds that underpin the concept of human rights, enabling students to grasp the multifaceted nature of this complex field. 2-To learn about the significant historical documents that have contributed to the development and formation of human rights theories, enriching their knowledge of the history and evolution of human rights. 3-To engage in critical examination and discussion of current political and ethical debates surrounding human rights, fostering critical thinking and encouraging students to form their own perspectives on these issues. 4-To study key legal documents and understand the work of crucial governmental and non-governmental institutions currently involved in the protection and promotion of human rights. This objective aims to make students aware of the global landscape of human rights protection and how it operates. 5-To undertake a detailed examination of at least one current problem area in human rights protection, providing a practical application of knowledge and giving students a deeper understanding of the complexities and challenges faced in human rights protection. 6-To promote an understanding and appreciation of the importance of human rights in all areas of life, including engineering, highlighting the significance of ethical considerations in technical professions. 7-To encourage students to consider how their future work as engineers could potentially impact human rights, fostering a sense of social responsibility and ethical awareness in their professional practice. 8-To cultivate skills in research, analysis, and argumentation related to human rights, thereby enhancing students' overall academic and intellectual skills.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the historical, philosophical, and political context of human rights, appreciating the complexities and dimensions of the concept. 2- Be familiar with significant historical documents and milestones that have contributed to the evolution of human rights theories and their role in shaping the current understanding of human rights. 3- Analyze and articulate positions on contemporary political and ethical debates about human rights, demonstrating critical thinking skills and a broad understanding of the issues. 4- Identify and understand the roles of major governmental and nongovernmental institutions in the promotion and protection of human rights, demonstrating an awareness of the broader global landscape of human rights advocacy. 5- Analyze a specific, current problem area in human rights protection, applying theoretical knowledge to real-world situations and demonstrating problem-solving skills. 6- Appreciate the relevance and importance of human rights considerations within their field of study, electrical engineering, and the broader engineering context. 7- Exhibit an understanding of the ethical responsibilities and potential impacts of engineering projects on human rights, preparing them to consider these factors in their future professional practice. 8- Show competence in researching, analyzing, and articulating arguments related to human rights, demonstrating development in academic skills applicable beyond this specific module. By achieving these learning outcomes, students will have not only a strong foundational understanding of human rights and its relevance to their discipline but also enhanced critical thinking and problem-solving skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduces students to the philosophic and political background of the concept of human rights. 2. Discusses important documents as part of the history of the development of human rights theories. 3. Examines important issues in current political and ethical debates about human rights. 4. Reviews core legal documents and the work of the most important governmental and nongovernmental institutions currently involved in human rights protection and



	promotion. 5. Examines at least one current problem area in human rights protection
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Traditional lectures will be used to introduce fundamental concepts, providing students with a strong theoretical foundation in the philosophic and political backgrounds of human rights, the history of human rights theories, and the role of various institutions in human rights protection and promotion. 2. Interactive Discussions: To facilitate critical thinking and engagement, class sessions will often involve interactive discussions. These might revolve around the analysis of important historical documents, current debates on human rights issues, or case studies of specific problem areas in human rights protection. 3. Group Projects: Students will work in groups to analyze a specific problem in human rights protection, encouraging teamwork, fostering a deeper understanding of the issue, and enabling students to apply theoretical knowledge to practical scenarios. 4. Guest Lectures: Inviting practitioners from the field, such as human rights activists, legal professionals, or engineers working on ethical issues, can provide students with real-world insights and inspire them to consider the impact of their work on human rights. 5. Research Assignments: Individual or group assignments might require students to



	conduct research on a specific topic related to human rights. This encourages independent learning, develops research skills, and deepens their understanding of the subject. 6. Case Studies: By analyzing and discussing real-world cases in class, students can understand the practical application of human rights theories, grasp the challenges faced in human rights protection, and consider the relevance of these issues in their own field of study. 7. Online Resources: Making use of online resources, such as academic articles, video lectures, podcasts, or documentaries, can supplement the course material and offer different perspectives on the subject matter. 8. Reflection Papers: Students could write reflection papers on how they see human rights intersecting with their engineering studies and future careers, promoting introspection and ethical awareness. These strategies aim to promote an active learning environment where students can deeply engage with the subject matter, enhancing their understanding and fostering important skills such as critical thinking, teamwork, research, and communication.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	50		



الحمل الدراسي الكلي للطالب خلال الفصل	
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Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the course: Overview of the module, its objectives, and learning outcomes. Introduction to the concept of human rights.
Week 2	Philosophical Background: An exploration of the philosophical principles that underpin the concept of human rights.



Week 3	Political Background: Discussion on the political history and influences on the development of human rights.
Week 4	Key Documents in Human Rights - Part I: Overview and analysis of significant historical documents related to human rights.
Week 5	Key Documents in Human Rights - Part II: Continued analysis of crucial historical documents, including their role in shaping current human rights theories. + Quiz
Week 6	Institutions and Human Rights: Examination of the roles of major governmental and nongovernmental institutions in human rights protection.
Week 7	Mid-Term Exam
Week 8	In-depth study of current political and ethical debates in human rights - Part II: Continued discussion and analysis of contemporary debates, encouraging students to articulate positions.
Week 9	Guest Lecture: Inviting a practitioner in the field to provide real-world insights.
Week 10	Begin Group Project: Introduction of a specific current problem area in human rights protection for group projects. + Quiz
Week 11	Group Project Work: Class time allocated for group work on the project, with the instructor available for consultation and guidance.
Week 12	Group Project Presentations: Each group presents their analysis and proposed solutions to the class.



Week 13	Human Rights and Engineering - Part I: Introduction to the intersection of human rights and engineering.
Week 14	Human Rights and Engineering - Part II: Detailed exploration of case studies showcasing the impact of engineering projects on human rights.
Week 15	Course Review and Reflection: Review of the main themes covered in the course, discussion of the relevance of human rights to future careers in engineering, and submission of reflection papers.
Week 16	Preparatory Week Before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Weeks	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				
Recommended Texts				
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 المعالجة)	(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.				



Semester two

Semester two	Mathematics II	ENG124
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics II		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG124		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader	Sameer F. Hamad	e-mail	Sfhamad4@uomisan.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	23/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics I	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Mathematics contributes to the core of engineering and serves as a source of knowledge from which engineering students can draw from. Thus, engineering students must have an ability to apply mathematical knowledge and skills to problem solving and engineering design tasks. Simply having mathematical or engineering knowledge without understanding of how to apply the learned strategies can limit a student's ability to provide correct answer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students after passing this course will be able to understand the basic mathematics principles and having the ability to deal with various derivative problems which makes him eligible to understand new more complicated topics.
Indicative Contents المحتويات الإرشادية	



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.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	2-11	All
	Assignments	5	5% (5)	2-12	All



	Home work	10	10% (10)	4-13	All
	Report	--	--	--	--
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Application of integration : Area between curves and under curves
Week 2	Application of integration : The volume of solids (Disk and Washer methods)
Week 3	Application of integration : The cylindrical shell method
Week 4	Application of integration : Lengths of curves in the plane ,
Week 5	Application of integration : Areas of Surfaces of Revolution
Week 6	Techniques of integration: Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions.
Week 7	Substitution and long division integrals
Week 8	Integration of Rational Functions by Partial Fractions.
Week 9	Integrals of $\tan x$ and $\cot x$
Week 10	Integration of Logarithmic Functions
Week 11	Numerical Integration: The Trapezoidal Rule
Week 12	Numerical Integration: The Simpson's Rule.
Week 13	Polar Coordinate



	Areas and Lengths in Polar Coordinates.
Week 14	Graphing in Polar Coordinates
Week 15	Matrices
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas' Calculus, G B. Thomas, R.L.Finney, M.D. Weir, Addison-Wesley; 12 th Edition, 2010	Yes
Recommended Texts		
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 المعالجة)	(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.



Semester two	Dynamic Engineering Mechanics	ME122
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanical Engineering Dynamic		Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME122		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader	Firas Lattef Hussany	e-mail	firaslattef@uomisan.edu.iq
Module Leader's Acad. Title	Assist. Lect.	Module Leader's Qualification	Master
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mechanical engineering Static	Semester	1
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: The theoretical foundations of Engineering Mechanics Dynamics have expanded substantially in recent years. The objective of this course is to introduce students to this fundamental area of Engineering Mechanics Dynamic which enables students to focus on the Kinematics of Particles. The course exposes students to knowing POSITION, VELOCITY, AND ACCELERATION as well as determination of the motion of particles, the motion of several particles and Dependent Motions. The course introduces basic of Newton's Second Law in Rectangular Components and Tangential and Normal Components and Energy and Momentum Methods and PRINCIPLE OF WORK AND ENERGY, POTENTIAL ENERGY, CONSERVATION OF ENERGY. Upon completion of this course, the students are expected to become proficient in Engineering Mechanics Dynamic, and to have the opportunity to explore the current topics in this area.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Recognize how to find the velocity and acceleration. 2. The effect of the path for calculating velocity and acceleration. 3. Effect of rectilinear and curve path in velocity and acceleration. 4. Study velocity and acceleration in circler path . 5. Relative motion.



	6. Effect of the forces on velocities and acceleration.
Indicative Contents المحتويات الإرشادية	• Subject-specific skills • Skills objectives of the course. • The ability to analyze the problem and write the steps for the solution in a simpler way. • The ability to think about addressing a particular problem or issue. • Writing scientific reports. • The ability to gain experience in dealing with complex mechanical systems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Readings, self-learning, panel discussions. • Exercises and activities in the lecture. • Homework. • Directing students to some websites to benefit and develop capabilities. • Conduct seminars to explain and analyze a specific issue and find solutions to it.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem)	77	Unstructured SWL (h/w)	4



الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6, 7 and 13
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	LO # 5, 11 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Rectilinear Kinematics: Continuous Motion
Week 2	Rectilinear Kinematics: Erratic Motion:



Week 3	General Curvilinear Motion
Week 4	Curvilinear Motion: Motion of a Projectile:
Week 5	Curvilinear Motion: Normal & Tangential Components:
Week 6	Curvilinear Motion: Cylindrical Components:
Week 7	Absolute Dependent Motion: Analysis of two particles:
Week 8	Relative Motion: Analysis of two particles using Translating axes
Week 9	Equation of Motion: Rectangular Coordinates
Week 10	Equation of Motion: Normal and Tangential Coordinates
Week 11	Equation of Motion: Cylindrical Coordinates
Week 12	Work and Energy
Week 13	Conservative Forces and Potential Energy
Week 14	Principles of Linear Impulse and Momentum
Week 15	Principle of Linear Impulse and Momentum for a System of Particles
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Higdon. 2- Meriam	Yes



	.	
Recommended Texts	1-Hibbeler. 2- Beer .	yes
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 المعالجة)	(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.				



Semester two	Engineering Workshops	ENG123
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Workshops		Module Delivery
Module Type	B		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	ENG123		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Dr. Mohammed Razzaq Mohammed	e-mail	mohammedrazzaq14@uomisan.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	22/06/2023	Version Number	1.0

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



Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	After completing this course, students should be able to do the following: • Identify some of the reasons why machining is commercially and technologically important. • Name the three most common machining processes. • Cite the two basic categories of cutting tools in machining. • List the various operations which may be performed on a center lathe. • Describe some methods of taper-turning on a center lathe. • Describe the various kinds of drilling machines. • Describe a horizontal milling machine. • Explain the difference between peripheral milling and face milling. • Describe the cylindrical grinding operation, and give an idea of the grinding wheel and work speeds recommended for this operation. • Describe the surface grinding operations with disc as well as cup type wheel. • Distinguish between fusion and pressure welding processes. • Describe the arc welding process. • Describe the principle of oxyacetylene gas welding. • Distinguish between welding, brazing and soldering. • Cite the requisite properties in a good foundry sand. • Describe the procedure of making a mold with a two piece split pattern. • Enumerate some common casting defects and explain the reasons which cause these defects. • Explain the difference between open and closed die forging techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcomes are: • Students would be able to work on various pieces of equipment and machines in different workshops such as turning, milling, and grinding. • Students would also be able to fabricate products using some manufacturing processes such as casting and forging, and join metallic materials using welding operations, brazing and soldering.



Indicative Contents المحتويات الإرشادية	Cutting Tools, Drilling Machine, Boring Tools, Arc welding equipment, Oxy-acetylene welding equipment, Turning machine (lathe), Cutting machine, Drilling machine, Milling machine, Sand Casting, Forging.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome



Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	2, 12	All
	Projects / Lab.				
	Report	5	20% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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 workshop Syllabus) المنهاج الاسبوعي للورش	
	Material Covered
Week 1	CARPENTRY: Carpentry Tools, Cutting Tools, Planes
Week 2	Boring Tools, Jigsaw, Power planes, Circular saw, Router Cutters, Orbital Sander
Week 3	FITTING: Holding Tools, Striking Tools, Cutting Tools
Week 4	Measuring, Marketing and Testing Tools, Impact Driver, Chain Saw, Angle Grinder
Week 5	Drilling Machine, Nail Gun, Impact Wrench, Cut-off Machine
Week 6	WELDING: Arc welding equipment
Week 7	Gas welding: Oxy-acetylene welding equipment
Week 8	Soldering equipment, Brazing equipment
Week 9	TURNING: Turning machine (lathe)
Week 10	Cutting machine
Week 11	Drilling machine
Week 12	Milling machine
Week 13	CASTING: Furnaces
Week 14	Sand Casting, Molding box, Cores, Casting inspection equipment



Week 15	FORGEABILITY: Anvil, Forging Hand Tools, Hammers, Tongs, Hearth, Swage block		
Week 16	Preparatory week before the final Exam		
Learning and Teaching Resources مصادر التعلم والتدريس			
	Text	Available in the Library?	
Required Texts			
Recommended Texts	Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover.	No	
	Manufacturing Processes, H.N. Gupta, R.C. Gupta, and Arun Mittal.	No	
Websites	YOUTUBE		



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 المعالجة)	(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.



Semester two	Physics	ENG125
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Physics		Module Delivery
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG125		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader	Hanan hashim abid	e-mail	hananalmaula@uomisan.edu.iq
Module Leader's Acad. Title	Assist lecture	Module Leader's Qualification	Master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	30/06/2023	Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	physics	Semester	2



Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. to provide an understanding of the behavior of fluids at rest, including topics such as liquid pressure, pressure measurement, surface tension, Bernoulli's equation, viscosity, and the effects of turbulence. Students will learn how to apply these concepts to practical engineering applications. 2. to introduce students to the properties of solids, including crystalline structures, stress and strain analysis, elasticity and plasticity, and the behavior of materials under different loading conditions. Students will learn about concepts such as elasticity modulus, Poisson's ratio, and the energy stored in stressed bodies. Acquire knowledge and skills in the measurement and analysis of physical quantities, including the use of appropriate instruments and units. 3. to familiarize students with temperature measurement techniques and the thermal properties of materials. Topics covered may include different types of thermometers, thermal expansion of materials, thermal impedance, and phase transformations in materials due to temperature changes. 4. focuses on the study of motion, including the equations of motion, simple harmonic motion (such as pendulums), damped motion, forced motion, and wave motion. Students will learn how to analyze and solve problems related to these types of motion. 5. to provide an understanding of sound waves, including their power and intensity, the relationship between sound and temperature, and the Doppler phenomenon. Students will learn about the properties and behavior of sound waves in different media.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Static Fluids: • Understand the principles of fluid pressure and its measurement. • Apply Bernoulli's equation to analyze fluid flow in various situations. • Explain the concept of surface tension and its practical applications. • Understand the behavior of fluids under turbulent conditions. • Analyze and solve problems related to fluid viscosity and flow.



	2. Material Properties: • Describe different types of crystalline solids and their structures. • Analyze stress and strain in materials and understand their behavior under different loading conditions. • Calculate elasticity modulus and Poisson's ratio for materials. • Evaluate the energy stored in stressed bodies and understand their elastic and plastic behavior. 3. Temperature Measuring: • Explain the working principles of different types of thermometers. • Understand the concept of thermal expansion and its measurement. • Analyze phase transformations in materials due to temperature changes. • Evaluate the thermal properties of materials and their implications in engineering applications. 4. Motion: • Apply the equations of motion to analyze and solve problems related to motion. • Understand the behavior of simple harmonic motion, such as pendulums. • Analyze damped and forced motion and their practical implications. • Understand the nature of wave motion and analyze longitudinal waves in pipes. 5. Sound Waves: • Understand the power and intensity of sound waves. • Analyze the relationship between sound and temperature. • Explain the Doppler phenomenon and its applications. • Analyze and solve problems related to the behavior of sound waves in different media.
Indicative Contents المحتويات الإرشادية	1. Static Fluids: • Understanding of liquid pressure and its measurement. • Knowledge of pressure gauges and their applications in mechanical systems. • Understanding surface tension and its effects on fluid behavior. • Application of Bernoulli's equation in fluid flow analysis. • Understanding viscosity and its role in fluid dynamics. • Understanding Poisson's law and its application to the behavior of fluids. • Understanding turbulent flow and its characterization using Reynolds number. 2. Material Properties: • Understanding the properties of solids. • Types of crystalline solids and their characteristics. • Knowledge of crystalline structures and their impact on material properties. • Understanding stress and strain in materials. • Knowledge of elasticity and plasticity in materials.



	• Understanding the concept of elasticity modulus and Poisson's ratio. • Knowledge of energy stored in stressed bodies and its implications. 3. Temperature Measuring: • Familiarity with different types of thermometers and their working principles. • Understanding thermal expansion and its effects on materials. • Knowledge of thermal impedance and its significance in thermal management. • Understanding phase transformation of materials with temperature changes. • Knowledge of thermal properties of materials, including conductivity and specific heat. 4. Motion: • Understanding the equations of motion for linear and angular motion. • Knowledge of pendulum motion and its characteristics. • Understanding damping motion and its impact on mechanical systems. • Knowledge of forced motion and resonance. • Understanding wave motion and its properties. • Knowledge of longitudinal waves in pipes and their behavior. 5. Sound Waves: • Understanding the power and intensity of sound waves. • Knowledge of the relationship between sound and temperature. • Understanding the Doppler phenomenon and its effects on sound perception.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programs. 2-Raise students' scientific and knowledge levels by employing the automatic technique, conversational approach, and active method.



Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5, 10	All
	Assignments	2	5% (5)	2, 12	All
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2 hr	20% (20)	7	All
	Final Exam	3 hr	70% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Static Fluids • liquid pressure
Week 2	• pressure gauges • Surface tension
Week 3	• Capillary effect • Bernoulli equation applications
Week 4	• Viscosity • Poisson's Law • Turbulent and Reynolds' number.
Week 5	Material Properties • Solids • crystalline solids types • quiz
Week 6	• crystalline structures • Stress • Strain •
Week 7	• Elasticity and plasticity • Elasticity Modulus
Week 8	• Poisson's ratio • Energy stored in a stressed body
Week 9	Temperature Measuring • Thermometers Types • Thermal Expansion • Thermal Impedance



Week 10	• Materials Phase Transformation • Thermal Properties of Materials • Quiz.
Week 11	Motion • Equation of Motion • pendulum
Week 12	• damping Motion • Forced motion
Week 13	• Wave Motion • longitudinal wave in Pipes
Week 14	Sound Waves • Power and intensity • relations of sound and temperature
Week 15	• Doppler Phenomenon
Week 16	A preparatory week before the Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	PHYSICS FOR SCIENTISTS AND ENGINEERS, Sixth Edition	Yes
Recommended Texts		
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 المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A 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.



Semester two	Electrical Engineering	ME125
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering		Module Delivery
Module Type	S	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME125		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level 1			
Administering Department	Mech. Department	College	Engineering College
Module Leader	Zahraa M . Alhamdawee	e-mail	zahraa.mo.eng@uomisan.edu.iq
Module Leader's Acad. Title	Asst. Lecture	Module Leader's Qualification	M.SC
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/06/2023	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 and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	- فهم ومعرفة دوائر التيار المستمر - التعرف على رموز الدوائر الكهربائية للتيار المستمر. - تطوير مهارات الطالب في استخدام طرق التحليل و نظريات الشبكات. - تطوير التفكير المجرد، المنطقي والناقد والقدرة على التفكير بشكل حاسم على عمل الآخرين
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A-The module aims are: - Identify the basic symbols and terminology of electrical engineering. - Learn the basics of DC circuits. - Know how to use analysis methods. - Knowledge of electrical network theories. -Learn to solve electrical circuits using analysis methods and network theories. B- Skill objectives of the course -Learn to solve problems related to electrical circuits. - Learn about the use of advanced scientific computers. - Learn how to use the shortest solutions in electrical engineering. - Learn how to find solutions to engineering problems using analysis methods.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: Elect. Quantities, Charge, Elect. Force(3hr),



	Conductors and insulators, Current, Elect. potential and voltage, Energy, and power (3hr). Resistance & resistivity(3hr), conductance & conductivity, Effect of temp. on resistance, Sources (voltage & current sources) (3hr), Ohms law, Kirchhoff's laws) (6hr), Series and parallel circuits(6hr), Voltage divider rule, Current divider rule(3hr), Branch current method(3hr), Mesh analysis(3hr), Star-delta and delta-star conversion(3hr), Superposition theory(3hr), Source Transformation(3hr), Thevenin's theorem(3hr), Norton's Theorem(3hr), Maximum transfer theorem(3hr),
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method. 2- The conversational method 3- Active method (depends on student activity)



Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to D.C circuits Elect. Quantities Charge Elect. Force
Week 2	Conductors and insulators Current Elect. potential and voltage Energy and power
Week 3	Fundamentals of elect. Circuits Resistance & resistivity
Week 4	conductance & conductivity Effect of temp. on resistance Sources (voltage & current sources)
Week 5	Ohms law Kirchhoff's laws
Week 6	Principles of elect. Circuits Series and parallel circuits
Week 7	Voltage divider rule Current divider rule
Week 8	Method of analysis Branch current method
Week 9	Mesh analysis
Week 10	Star-delta and delta-star conversion



Week 11	Network theorems. Superposition theory
Week 12	Source Transformation
Week 13	Thevenin's theorem
Week 14	Norton's Theorem
Week 15	Maximum transfer theorem
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: Kirchhoff's Voltage and Current Laws Experiment
Week 3	Lab 3: Ohms Law
Week 4	Lab 4: Open & close Circuit
Week 5	Lab 5: Superposition
Week 6	Lab 6: Thevenin's Theorem and Kirchhoff's Laws
Week 7	Lab 7: Norton's Theorem and Kirchhoff's Laws

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Past lectures	Yes



Recommended Texts	Introductory Circuit Analysis, Boylestad	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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 المعالجة)	(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.				



Semester two	Computer I	UOM122
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer I		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM122		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	Semester of Delivery	1
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammed Tali Qasim Almalchy	e-mail	Mohammed.almalchy@uomisan.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	1
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Understand the fundamental concepts of computer systems and information technology. 2. Identify the hardware and software components of a computer system and explain their functions. 3. Develop basic computer operating skills using the Windows operating system. 4. Manage files and folders efficiently using the operating system. 5. Develop students' skills in using word processing applications and creating tables for preparing academic documents. 6. Apply computer applications to support academic and engineering tasks. 7. Promote effective and responsible use of computer technology in education and professional practice.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Explain the basic concepts of computer systems and information technology. 2. Describe the functions of major computer hardware components. 3. Differentiate between system software and application software. 4. Explain the basic functions of the Windows operating system. 5. Operate a personal computer safely and efficiently. 6. Manage files, folders, and storage devices using Windows. 7. Create, edit, save, and print professional documents using Microsoft Word, Excel sheet and PowerPoint. 8. Format text, tables, images, and page layouts in Word documents. 9. Apply basic computer skills to prepare reports, assignments, and technical documents.



	10. Demonstrate good practices in organizing and managing digital files.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: <u>Fundamentals:</u> 1. Introduction to Computer Systems Definition of computers Characteristics and applications of computers Types and generations of computers 2. Computer Hardware Input devices Output devices Central Processing Unit (CPU) Memory (RAM and ROM) Storage devices 3. Computer Software System software Application software Utility software 4. Operating Systems Functions of an operating system Windows operating system basics Desktop environment and file management 5. File and Folder Management Creating, renaming, copying, moving, and deleting files and folders Managing storage devices 6. Microsoft (Word, Excel, and PowerPoint) Creating and editing documents



	Text formatting Tables, images, and page layout Headers, footers, and page numbering Printing documents 7. Introduction to Computer Security Basic cybersecurity concepts Password security Malware and antivirus software Safe computer practices
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple experiments that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method. 4- Problems Solving. 5- Independent study

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	63	Structured SWL (h/w)	7



الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 3, 9 and 10
	Assignments	2	10% (10)	2, 12	LO # 4, 5, 10, 12 and 13
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 6, 7, 8 and 11
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered				
Week 1	Introduction to Computers, Data and Information, Computer System Components, Types of Computers and Their Applications, Hardware and Software.				
Week 2	Input and Output Devices.				
Week 3	Central Processing Unit (CPU), Memory, Storage Devices, and Computer Ports.				



Week 4	Operating Systems and the User Interface.
Week 5	File and Folder Management.
Week 6	Microsoft Word: Creating Documents.
Week 7	Formatting Text, Tables, and Images in Microsoft Word.
Week 8	Midterm Examination.
Week 9	Microsoft Excel: Creating Worksheets.
Week 10	Formatting Worksheets and Using Basic Functions and Formulas.
Week 11	Microsoft PowerPoint.
Week 12	The Internet and Web Browsers.
Week 13	Internet-Based Research Techniques.
Week 14	Email and Electronic Communication.
Week 15	Computer Troubleshooting and Basic Maintenance.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to the computer laboratory, safety procedures, proper computer startup and shutdown, and identification of peripheral devices.
Week 2	Lab 2: Hands-on identification of internal and external computer components (CPU, RAM, HDD/SSD, motherboard, input and output devices).
Week 3	Lab 3: Connecting peripheral devices and identifying different computer ports (USB, HDMI, Ethernet, Audio, etc.).
Week 4	Lab 4:



	Introduction to the Windows operating system, desktop environment, taskbar, Start menu, and basic system settings.
Week 5	Lab 5: File and folder management: creating, copying, moving, renaming, deleting, and restoring files and folders.
Week 6	Lab 6: Using File Explorer, searching for files, compressing and extracting files, and working with external storage devices.
Week 7	Lab 7: Microsoft Word: creating, saving, opening, and editing documents.
Week 8	Lab 8: Formatting text in Microsoft Word, including fonts, paragraphs, alignment, bullets, and numbering.
Week 9	Lab 9: Inserting tables, images, and shapes; page setup; headers and footers; and printing documents.
Week 10	Lab 10: Microsoft Excel: creating, saving, opening, and editing worksheets.
Week 11	Lab 11: Creating and formatting worksheets, using formulas, functions, and keyboard shortcuts in Microsoft Excel.
Week 12	Lab 12: Microsoft PowerPoint: creating, saving, and opening presentations; exploring the interface; and developing an academic presentation using interactive tools.
Week 13	Lab 13: Using web browsers, searching with search engines, and downloading files safely.
Week 14	Lab 14: Creating an email account, sending and receiving emails, attaching files, and organizing email messages.
Week 15	Lab 15: Final Practical Examination.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Graham Brown & David Watson Cambridge IGCSE Information and Communication Technology 2020 ,Third Edition.	Yes



Recommended Texts	Alan Evans, Kendall Martin, Mary Anne Poatsy Technology in Action Complete 16th Edition.	yes
Websites	https://networkbasic.rf.gd/computer-basics.html?i=1	

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 المعالجة)	(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.				



Semester two	Arabic Language I	UOM123
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MODULE DESCRIPTION FORM

وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية I		
Module Type	Support	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Seminar	
Module Code	UOM123		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	1
Administering Department	CE	College	E
Module Leader	Aya	email	Aya.hamed@uomisan.edu.iq
Module Leader s Acad. Title		Module Leader s Qualification	MSc
Module Tutor	Aya	e-mail	Aya.hamed@uomisan.edu.iq
Peer Reviewer Name	Murtada Abass	e-mail	murtadaa@uomisan.edu.iq
Scientific Committee Approval Date	25-11-2024	Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الاخرى			
Prerequisite module		Semester	
Co-requisite module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	تعليم الطلبة كتابة اللغة العربية بأسلوب خالي من الأخطاء الإملائية وتمكينه من كتابة الأوامر الإدارية بإتقان وبأسلوب بسيط.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	



Indicative Contents المحتويات الإرشادية	
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1.

Student \Morkload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	30	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب خلال الفصل	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	20	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب اسبوعيا	
TOTAL SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	10% (10)		
	Assignments	10% (10)		
	Report	10% (10)		
	Seminar	10%(10)		
Summative assessment	Midterm Exam	1.5hr 20 % (20)	7	
	Final Exam	3hr 50 % (50)	16	All
Total assessment		100 % (100 marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	الكلام العربي وأقسامه (الأسم والفعل والحرف)
Week 2	كتابة الناء العربية المربوطة وكيفية التفريق بينها وبين الهاء وبين الناء المبسوطة
Week 3	علامات الإعراب الأصلية والفرعية مع التفريق بينهما
Week 4	علامات الترقيم
Week 5	أهم علامات الترقيم (الفاصلة، الفاصلة المنقوطة، النقطة، النقطتان الرأسيتان، علامة الاستفهام)
Week 6	أهم علامات الترقيم (علامة التعجب، علامة التنصيص المزدوجة، القوسان، علامة الحذف، علامة الشرطة)
Week 7	الكتاب الرسمي (أهميته وطريقة كتابته)
Week 8	الطلب اليدوي (كيفية القيام بخطوات إنشاء الطلب اليدوي وترتيب خطواته)



Week 9	كتابة الضاد والطاء وكيفية التفريق والتمييز بينهما
Week 10	الأعداد (من 1-1000000) كتابة الأعداد بشكل خطي مضبوط خالي من الأخطاء .
Week 11	همزتا(الوصل و القطع) همزة الوصل تعريفها ومواقعها
Week 12	همزة القطع تعريفها ومواقعها وطرق رسمها
Week 13	الألف اللينة المفصورة والممدودة
Week 14	الف التفريق وطرق التمييز بينها .
Week 15	امتحان منتصف الفصل(المد)

Learning and Teaching Resources

مصادر التعلم والتدريس

Text	Available
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	in the Library?
Required Texts	No
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 المعالجة)	(45-49)	More work required but credit awarded
	F- Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks with 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.



Semester three

Semester three	Mathematics III	ENG201
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics III		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG201		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ali AL-MALIKI	e-mail	ali.al-maliki@uomisan.edu.iq
Module Leader's Acad. Title	Teacher Assistant	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Engineering Mathematics I	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Be educated on Mathematics methods. 2. Know the procedure of calculations. 3. Develop students understanding of useful Mathematics methods in engineering calculations. 4. Studying and solve applications using Mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is a student have the knowledge of useful mathematics methods makes him deal with the problems, applications and calculations in different branches of science in mechanical engineering
Indicative Contents المحتويات الإرشادية	



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 examples and exercises, while at the same time refining and expanding their logical thinking skills. This will be achieved through classes, interactive tutorials and by considering solving of simple applications.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	3, 5, 10	All
	Assignments	2	15% (15)	4, 12	All
	Homework	2	10% (10)	2, 9	All
	Midterm Exam	2 hr	10% (10)	8	All



Summative assessment	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: Matrices • Properties of matrices • Matrices types
Week 2	Chapter One: Matrices • Operations on matrices • Determinants • Homework
Week 3	Chapter One: Matrices • Matrix Inverse (Inverse of a Matrix) • Quiz.
Week 4	Chapter One: Matrices • solution of linear simultaneous equations • Assignment
Week 5	Chapter Two: VECTOR CALCULUS • Scalars and vectors, component of a vector, • rules of vector arithmetic • Quiz.
Week 6	Chapter Two: VECTOR CALCULUS • norm of a vector • normalizing of vectors
Week 7	Chapter Two: VECTOR CALCULUS • dot product



	• cross product, product of three or more vectors
Week 8	Chapter two: VECTOR CALCULUS • equations of lines in space • planes in 3-space • Midterm Exam
Week 9	Chapter Three: VECTOR - VALUED FUNCTIONS • Limits and continuity, derivatives, forms of a curve equation in space, parametric representation, unit tangent and normal vectors • Homework
Week 10	Chapter Three: VECTOR - VALUED FUNCTIONS • curvature, radius of curvature, motion along a curve, velocity, acceleration and speed, normal and tangential components of acceleration • Quiz.
Week 11	Chapter Four: MULTIPLE INTEGRALS • Double integral, areas and volumes
Week 12	Chapter Four: MULTIPLE INTEGRALS • double integral in polar coordinates • Assignment
Week 13	Chapter Four: MULTIPLE INTEGRALS • parametric surfaces, surface area, surface integrals
Week 14	Chapter Four: MULTIPLE INTEGRALS • surface integrals • evaluation of volume and triple integral
Week 15	Chapter Four: MULTIPLE INTEGRALS • evaluation of volume and triple integral
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano - Thomas's calculus	
Recommended Texts	1. H.K. Dass - Advanced Engineering Mathematics-S Chand & Co Ltd (2007)	
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 المعالجة)	(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.				



Semester three	Fluid Statics	ME212
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Fluid Statics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME212		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader		e-mail	E-mail
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	25/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Statics I	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The overall objectives of a fluid mechanics course are to give students a solid foundation in the fundamentals of fluid mechanics, problem-solving skills, practical knowledge, and a mindset for further learning and using fluid mechanics in diverse engineering situations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	
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	The course objectives will be communicated via a variety of teaching methods. There will be PPT presentations for the chapter headings, definitions, graphs, and several helpful images, as well as a summary at the end of each chapter. The PPT provides details on brand-new subjects and unsolved examples, which will be solved on the whiteboard and shown for students to view
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	
	Assignments	2	10% (10)	2, 12	
	Projects				
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All



Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Defining the unit systems
Week 2	Fluids definition and their physical properties
Week 3	Types of fluid, law of continuum
Week 4	Pressure and its applications
Week 5	Defining the absolute and gauge pressures
Week 6	Pressure variation with the elevation.
Week 7	Mid-term Exam
Week 8	Forces on immersed bodies
Week 9	Determining the resultant force acting on a submerged plane surface and the vertical and horizontal components on a curved submerged body
Week 10	Floating bodies and their instability
Week 11	Definition the buoyancy force and its application in floating bodies
Week 12	Determining the stabilities of the floating bodies by metacenter
Week 13	Accelerated Fluids: the effect of moving of fluid in constant acceleration on the pressure distribution is studied. Both linear and rotational acceleration is studied.
Week 14	Dimensional analysis: The most important dimensionless numbers are defined



Week 15	The methods of collecting multi variables in a single dimensionless relation is given
Week 16	Preparatory week before the 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	1. Fluid Mechanics. C. Hibbeler 2. Fluid Mechanics. Frank M. WHITE 3. Fundamental of fluid mechanics. Munson, Young, and Okiishi	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 المعالجة)	(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.				



Semester three	Thermodynamics I	ME213
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Thermodynamics I		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	ME213				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	Semester of Delivery		2
Administering Department		Mechanical	College	Engineering College	
Module Leader	Ali Hussein Jabbar Al-Jubainawi		e-mail	alihussein.mcm@uomisan.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Scientific Committee Approval Date		3/07/2023	Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Thermodynamics II, Air Conditioning and Refrigeration	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	The module aims are:



أهداف المادة الدراسية	1.To provide students with the ability to integrate the principles of classical thermodynamics and fluid mechanics in order to provide a foundation for the subsequent analysis of industrial plant and process equipment. 2.To ensure all students can approach thermodynamic analysis of systems in a logical and methodological manner. 3.To know the fundamentals, concepts and terminologies associated with thermodynamics. 4.To understand the laws of thermodynamics and an appreciation of their consequences. 5.To develop some elementary analysis skills using the first and second laws of thermodynamics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. To introduce the fundamentals, concepts & definitions of thermodynamic properties. 2. To clarify independent and dependent, intensive & extensive properties. 3. To know state diagram, path function, thermodynamic equilibrium and process. 4. To introduce the reversibility and irreversibility processes. 5. To know sources and forms of energy including potential energy, kinetic energy, internal energy, and flow or displacement energy. 6. To understand relationship between heat and work. 7. To understand different forms of work and power. 8. To define the concept of heat. 9. To know real gases and ideal or perfect gases. 10. To Explain the differences between Boyle's, Charle's and Gay-Lussac's laws. 11. To recognize the first law thermodynamic in term of NFEE and SFEE. 12. To define the steam and two-phase system and process using steam. 13. To know the second law of thermodynamics.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: - Heat, work and the system (3hr), - The state of the working fluid, reversibility and reversible work (6hr), - Conservation of energy and the non-flow equation (NFEE) (6hr), - The flow energy equation (SFEE) (3hr), - Liquid, vapor, gas and the use of vapor tables(9hr), - The ideal gas and specific heat (6hr), - Reversible non flow processes and reversible flow process (3hr), - Irreversible processes and non-steady flow processes (3hr), - The heat engine and the second law statements (3hr), - Entropy (3hr).



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple experiments that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	15% (15)	2, 12	LO # 3, 4, 6, 7 and 13
	Report	1	15% (15)	13	LO # 5, 11 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Fundamentals of thermodynamics • Definition of terms
Week 2	Chapter One: Fundamentals of thermodynamics • Heat, work and the system
Week 3	Chapter One: Fundamentals of thermodynamics • Reversibility and reversible work
Week 4	Chapter One: Fundamentals of thermodynamics • The zeroth law of thermodynamics
Week 5	Chapter Two: Energy and the first law of thermodynamics • Non-flow energy equation
Week 6	Chapter Two: Energy and the first law of thermodynamics • Steady-Flow energy equation.
Week 7	Chapter Three: Ideal gas and specific heat • Equation of ideal gas. • Relation between specific heats. • Boyle's, Charle's and Gay-Lussac's laws.
Week 8	Chapter Three: Ideal gas and specific heat • Process using ideal gas. • Closed and open systems –reversible.
Week 9	Chapter Three: Ideal gas and specific heat • Applications of ideal gas systems
Week 10	Chapter Four: Steam and two-phase system • Properties of steam and liquid. • Steam table.
Week 11	Chapter Four: Steam and two-phase system • Process using steam.
Week 12	Chapter Four: Steam and two-phase system • Open System-Irreversible Process
Week 13	Chapter Five: Second law of thermodynamics • Heat engine and Heat pump. • Efficiency and coefficient of performance.
Week 14	Chapter Five: Second Law of Thermodynamics • Entropy. • Entropy and the processes.
Week 15	Chapter Five: Second Law of Thermodynamics • Principles of entropy increase
Week 16	Preparatory week before the final Exam



Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Text of lectures. 2. Rajput, R.K., 2005. A textbook of engineering thermodynamics. Laxmi Publications. 3. Borgnakke, C. and Sonntag, R.E., 2022. Fundamentals of thermodynamics. John Wiley & Sons.	Yes
Recommended Texts	1. Rajput, R.K., 2005. Thermal engineering. Firewall Media. 2. Khurmi, R.S. and Gupta, J.K., 2008. A textbook of thermal engineering. S. Chand Publishing.	yes

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 المعالجة)	(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.				



Semester three	Mechanics of Materials	ME214
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanics of Material		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME214		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Noor Kahim Faheed	e-mail	Noor.kf@uomisan.edu.iq
Module Leader's Acad. Title	Teacher	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Strength of Materials	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• The main objective of the study of the mechanics of materials is to provide the engineer with the means of analyzing and designing various machines and load bearing structures. • Explain how materials react to various types of stress under a variety of conditions. • As the engineering design of different components, structures etc. used in practice are done using different kinds of materials, it is essential to understand the basic behavior of such materials
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is to make the students acquainted with the concept of load resultant, consequences and how different kinds of loadings can be withstood by different kinds of members with some specific materials.
Indicative Contents المحتويات الإرشادية	



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	2, 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction to Simple Stress and Strain - Types of Loads - Mechanical Properties - Stress and Strain
Week 2	Chapter One: Introduction to Simple Stress and Strain - Direct or normal stress and Strain - Stress – Strain Curve
Week 3	Chapter One: Introduction to Simple Stress and Strain - Poisson's Ratio , - Shear stress - Strain Compound Bars.
Week 4	Chapter Two: Introduction to Shear Force and Bending Moment Diagrams - Types of Loading - Types of Support Definition



	• Sign Convention of Shearing Force And Bending Moment
Week 5	Chapter Two: Introduction to Introduction to Shear Force and Bending Moment Diagrams • Shearing Force • Bending Moment For Different Cases
Week 6	Chapter Two: Introduction to Introduction to Shear Force and Bending Moment Diagrams • Relationship between Shear Force (Q), Bending Moment (M) and Intensity of Loading (W).
Week 7	Chapter Three: Introduction to Bending Stress of Beam • Simple Theory of Bending , Neutral Axis and Section Modulus
Week 8	Chapter Three: Introduction to Bending Stress of Beam • Combined bending and direct stress- eccentric loading
Week 9	Chapter Four: Introduction to Shear Stress Distribution • Distribution of shear stress due to bending, Applications on the Different Sections.
Week 10	Chapter Five: Introduction to Slope and Deflection of Beams • Direct integration method (Double Integration) , Macaulay's method
Week 11	Chapter Five: Introduction to Slope and Deflection of Beams • Mohr's "Area-Moment" Method
Week 12	Chapter Five: Introduction to Slope and Deflection of Beams • Continuous Beams- Chaperon's "Three-Moment" Equation • Built in Beam (Fixed-Fixed).
Week 13	• Students presentations
Week 14	• Students presentations
Week 15	• Students presentations • Quiz
Week 16	Preparatory week before the final Exam



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Tensile Test
Week 2	Lab 2: Tensile Test
Week 3	Lab 3: Compression Test
Week 4	Lab 4: Compression Test
Week 5	Lab 5: Shear Test
Week 6	Lab 6: Shear Test
Week 7	Lab 7: Impact Test
Week 8	Lab 8: Impact Test
Week 9	Lab 9: Hardness Test
Week 10	Lab 10: Hardness Test
Week 11	Lab 11: Torsion Test
Week 12	Lab 12: Torsion Test
Week 13	Lab 13: Review
Week 14	Lab 14: Examination
Week 15	Lab 15: Final examination



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Mechanics Of Materials I 3rd Edition - Mechanics Of Materials 6th Edition - Mechanics Of Materials 8th edition	Yes
Recommended Texts	Mechanics Of Materials 9th edition	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 المعالجة)	(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.



Semester three	Mechanical Drawing	ME215
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mechanical Drawing		Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	ME215		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	1
Administering Department	Mech. Department	College	Engineering College
Module Leader	Dheyaa Sabeeh AL-SAEDI	e-mail	Diaa.sabeeh@uomisan.edu.iq
Module Leader's Acad. Title	Assist. Lec.	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	15/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Drawing	Semester	1
Co-requisites module		Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Be educated on developing an understanding of and appreciation of Technical Drawing Industrial Society; 2. Discover and develop their talents in the fields of Technical Drawing and related technologies; 3. Develop technical problem-solving skills in Technical Drawing as related to materials and processes; 4. Develop the correct and accepted Technical Drawing skills as demanded by Industry; 5. Be aware of the career opportunities available in Technical Drawing and its related fields; 6. have a working knowledge and understanding of Computer Aided Drafting applications; 7. Develop skills to use drawing in the process of design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Get information about the important tools for engineering drawing. This will give student basic knowledge of technical drawings professions and means of communications to others. 2. Learning how to draw the shapes, angles and lines and others which is essential for engineer. 3. Develop student's imagination and ability to represent the shape size and specifications of physical objects. 4. Understand the main idea of using dimension for engineering drawing 5. Familiarize with different drawing equipment, technical standards and procedures for construction of geometric figures. This will give students ability to draw three dimension objects on the paper and to draw the pictorial drawings. 6. Explain the principle of projection and sectioning 8. Understand the intersection, development of surface of body and fasteners 9. Learning the main idea from assembly and detail drawing
Indicative Contents المحتويات الإرشادية	The main indicative contents are: 1. Introduction - General Revision Types of lines, projection, sections, dimensions by hand and using AutoCAD software. 2. Methods of attaching and fixing mechanical parts: 2-1: Non-permanent attachment and fixation: A. Types of bolts and studs, and their proportion, uses. B. Different types of locking devices and their specification. C. Different types of foundation bolts. D. keys, cotters and pins with BIS conventions. E. Different types of pins. 2-2: Permanent bonding and fixation A. Description of Riveted joints.



	B. Welded Joints and their representation (Actual and Symbolic) on drawing as per BIS. 3. Working drawing of gears such as spur gears. 4. Working drawing of springs such as compression spring. 5. Limits, fit, tolerance. Dimensional tolerance, geometrical tolerance. 6. Symbols for machining and surface finishes (grades and micron values) 7. Sketching & Assembly Drawing of machine vice. 8. Numbering and preservation of drawing. 9. Disassembly Drawings. 10. Introduction to CAD, Advantages of using CAD, Relative Co-ordinate System Knowledge of Workspace in drawing space: 2D classic, Drafting & annotation, 3D modeling, etc. Use of drawing utilities, Snap, Ortho, Grid, Osnap, Polar tracking. Customization of working environment with tool using shortcut key, menu driven or ribbon setting
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple physical example (prototypes) that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the technique, conversational approach, and active method.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		



Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments/classwork	15	10% (15)	Continuous	All
	Assignments/Homework	15	10% (15)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction - General Revision Types of lines, projection, sections, dimensions by used hand and AutoCAD software.
Week 2	Bolts and Bolted joints Type of Bolts and Nuts, Assembly Drawing for Bolting System
Week 3	Keys and Keyways joints, Types of Keys and their uses Assembly Drawing for Keys System
Week 4	Welding joints, Welding symbols, Assembly Drawing for Welding System indicated the Welding symbols.
Week 5	- Rivets and Riveted joints, Types of Rivets and Rivets joints, QUIZ
Week 6	Assembly Drawing for Rivets System
Week 7	Mid – Term Exam
Week 8	Springs, Types of Springs and their uses
Week 9	Assembly Drawing for Compressed Spring
Week 10	- Assembly Drawing. QUIZ
Week 11	Types of Gears, Spur Gear definitions, Drawing Spur Gear, and Assembly Drawing for Spur Gear box System.
Week 12	Principle of Tolerances
Week 13	Principle of Fits



Week 14	• Assembly Drawing
Week 15	• Disassembly drawing.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	• Systematic engineering drawing book , author Jaafar Al-Khafaf كتاب الرسم الهندسي المنهجي, للمؤلف عبد الرسول الخفاف	Yes
Recommended Texts	Machine Drawing - Narayana K Boundy, A.w. (Albert William). Engineering drawing. 3rd ed Textbook of Engineering Drawing Second Edition K. Venkata Reddy	NO
Websites	AutoCAD Training Exercises for Beginners-yotube AutoCAD-Mechanical drawing problems -youtube	

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 المعالجة)	(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.				



Semester three	Programming of Computers	ME216
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Programming of Computers		Module Delivery
Module Type	B		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ME216		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammed Tali Qasim	e-mail	Mohammed.alamlachy@uomisan.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The course provides a gentle introduction to the MATLAB computing environment, and is intended for beginning users and those looking for a review. It is designed to give students a basic understanding of MATLAB, including popular toolboxes. The course consists of interactive lectures and sample MATLAB problems given as assignments and discussed in class. No prior programming experience or knowledge of MATLAB is assumed. Concepts covered include basic use, graphical representations and tips for designing and implementing MATLAB code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Clarify the basic concepts of programming in MATLAB language through a set of programming instructions. 2. Gain skills in handling programming problems and issues. 3. Acquiring basic skills as an introduction to building large and applied programs. 4. Gain a basic understanding of how programmed systems work in various industrial applications. 5. Ability to program and design application programs. 6. The ability to think about addressing a particular problem or issue. 7. Writing scientific reports. 8. The ability to gain experience in dealing with programmed systems.



Indicative Contents المحتويات الإرشادية	1. Readings, self-learning, panel discussions. 2. Exercises and activities in the lecture. 3. Homework. 4. Directing students to some websites to benefit and develop capabilities. 5. Conducting seminars to explain and analyze a specific issue and find solutions to it.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Explanation and clarification through lectures. The method of displaying scientific materials on display devices: data show, smart boards, and plasma screens.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	2, 12	All
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Matlab language and writing symbols with use it
Week 2	Types of constants , variables and arithmetic sentences.
Week 3	Write a simple matrix and how to address it to find any element in it.
Week 4	Write a regular matrices and how to address it to find any element in it.
Week 5	Standard matrices unit, zeroes and eye matrices.
Week 6	Operations on arrays
Week 7	Arithmetic operations between a matrix and a singular number or between matrices.
Week 8	Searching for a partial matrix and using prompts to find the sum of the elements of the matrix or the largest or smallest element in it.



Week 9	Perform and evaluate relational and logical operations.
Week 10	Comparative and logical operators If-else-end form switch-case-otherwise form.
Week 11	Rotation and repetition statements.
Week 12	Formula for storing variables and for loading them from a file.
Week 13	Dealing with files
Week 14	Instructing plot and partial graphs
Week 15	Great function that deal with one or with several variables with input and one variable with output.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Lab 1: Steps to create, compile and implement a program using Matlab language.
Week 3-4	Lab 2: Implement programs for Array (one and two dimensions)
Week 5-6	Lab 3: Implement programs for conditional statements (if-statement)
Week 7-8	Lab 4: Implement programs for conditional statements (switch-statement)
Week 9-10	Lab 5: Implement programs for Loop statements (for-statement)
Week 11-12	Lab 6: Implement programs for plot and partial graphs
Week 13-14	Lab 7: Solving differential equations
Week 15	Lab 8: Implement programs for plot 2D&3D



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	تعليم البرمجة بلغة ماتلاب بالأمتلة الشاملة	yes
Websites	http://www.mathworks.in/matlabcentral/	

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 المعالجة)	(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.



Semester three	Arabic Language II	UOM123
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	اللغة العربية I		
Module Type	Support	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Seminar	
Module Code	UOM123		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	2
Administering Department	CE	College	E
Module Leader	Aya	email	Aya.hamed@uomisan.edu.iq
Module Leader s Acad. Title		Module Leader s Qualification	MSc
Module Tutor	Aya	e-mail	Aya.hamed@uomisan.edu.iq
Peer Reviewer Name	Murtada Abass	e-mail	murtadaa@uomisan.edu.iq
Scientific Committee Approval Date	25-11-2024	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
Prerequisite module		Semester	
Co-requisite module		Semester	

Module Aims, Learning Outcomes and Indicative Contents اهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية	
Module Aims اهداف المادة الدراسية	تعليم الطلبة كتابة اللغة العربية بأسلوب خالي من الأخطاء الإملائية وتمكينه من كتابة الأوامر الإدارية بإتقان وبأسلوب بسيط.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الارشادية	



Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1.

Student \Morkload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	30	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب خلال الفصل	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	20	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب اسبوعيا	
TOTAL SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	10% (10)		
	Assignments	10% (10)		
	Report	10% (10)		
	Seminar	10%(10)		
Summative assessment	Midterm Exam	1.5hr 20 % (20)	7	
	Final Exam	3hr 50 % (50)	16	All
Total assessment		100 % (100 marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	الأخطاء الإملائية التي تحدث في الحاسبة
Week 2	الاقتصاد الإملائي في الحاسبة
Week 3	جملة الغاية في لغة الإدارة
Week 4	الفصل والوصل بين الكلمات وما يجب فصله وما يجب وصله وما يجوز فصله ووصله
Week 5	أوهام إملائية
Week 6	حروف الجر في الكتب الإدارية
Week 7	أخطاء في استعمال حرف الواو في المخاطبات الإدارية
Week 8	مبادئ تقويم اللسان (علم البيان : التشبيه , الاستعارة , الكناية)
Week 9	مبادئ تقويم اللسان (علم البديع : المحسنات اللفظية , السجع , الاقتباس , الجناس)
Week 10	مبادئ تقويم اللسان (علم البديع : التورية , الطباق , المقابلة)



Week 11	الإعجاز اللغوي في القرآن الكريم (دلالة التفريق بين الألفاظ المترادفة)
Week 12	دلالة الذكر والحذف
Week 13	دلالة التقديم والتأخير
Week 14	نصب وحزم الأفعال (المفرد والجمع)
Week 15	امتحان منتصف الفصل (المد)

Learning and Teaching Resources

مصادر التعلم والتدريس

Text	Available
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		in the Library?
Required Texts		No
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 (قد المعالجة)	(45-49)	More work required but credit awarded
	F- Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks with 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.



Semester four

Semester four	Mathematics IV	ENG202
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics IV		Module Delivery
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG202		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ali AL-MALIKI	e-mail	ali.al-maliki@uomisan.edu.iq
Module Leader's Acad. Title	Teacher Assistant	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date		Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Engineering Mathematics II	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Be educated on Mathematics methods. 2. Know the procedure of calculations. 3. Develop students understanding of useful Mathematics methods in engineering calculations. 4. Studying and solve applications using Mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is a student have the knowledge of useful mathematics methods makes him deal with the problems, applications and calculations in different branches of science in mechanical engineering
Indicative Contents المحتويات الإرشادية	



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 examples and exercises, while at the same time refining and expanding their logical thinking skills. This will be achieved through classes, interactive tutorials and by considering solving of simple applications.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	3, 5, 10	All
	Assignments	2	15% (15)	4, 12	All
	Homework	2	10% (10)	2, 9	All
	Midterm Exam	2 hr	10% (10)	8	All



Summative assessment	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: DIFFERENTIAL EQUATIONS - Fundamental Definitions - Solutions of First Order : variable separable - Solutions of First Order : exact
Week 2	Chapter One: DIFFERENTIAL EQUATIONS - Solutions of First Order : linear - Solutions of First Order : Bernoulli
Week 3	Chapter One: DIFFERENTIAL EQUATIONS - Solutions of second and Higher Order: Linear equation with constant coefficients, linear homogeneous equations with constant coefficients - Quiz.
Week 4	Chapter One: DIFFERENTIAL EQUATIONS - nonhomogeneous equations, solving of non-homogenous equations, variation of parameters - Assignment
Week 5	Chapter One: DIFFERENTIAL EQUATIONS - higher order linear equations with constant coefficients, D-operator, Cauchy equation. - Quiz.
Week 6	Chapter Two: LAPLACE TRANSFORMATION - Laplace Transformation Definition - Basic Properties of The Laplace Transformation
Week 7	Chapter Two: LAPLACE TRANSFORMATION



	The Laplace Transformation of Elementary Functions
Week 8	Chapter two: LAPLACE TRANSFORMATION - The Laplace Transform of $e^{at} f(t)$, The Laplace Transform of $t^n f(t)$ - Midterm Exam
Week 9	Chapter Two: LAPLACE TRANSFORMATION Inverse Laplace transforms
Week 10	Chapter Two: LAPLACE TRANSFORMATION - The Solution of Differential Equations Using Laplace Transforms - Quiz.
Week 11	Chapter Three: INFINITE SEQUENCES AND SERIES Introduction, Convergence and Divergence Test
Week 12	Chapter Three: INFINITE SEQUENCES AND SERIES - Geometric Series and Partial Sum - Assignment
Week 13	Chapter Three: INFINITE SEQUENCES AND SERIES Integral, Comparison, Ratio and Root Tests
Week 14	Chapter Three: INFINITE SEQUENCES AND SERIES Alternating series, Power Series
Week 15	Chapter Three: INFINITE SEQUENCES AND SERIES Taylor and Maclaurin Series, Applications of Power Series
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano - Thomas's calculus	



Recommended Texts	1. H.K. Dass - Advanced Engineering Mathematics-S Chand & Co Ltd (2007)	
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 المعالجة)	(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.				



Semester four	Fluid Dynamics	ME222
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Fluid Dynamics		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME222		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Dr. Sabah F. H. Alhamdi	e-mail	E-mail: sabahalhamdi@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Ass. Lec. Huda Radhi Jabar	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	25/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Statics	Semester	1
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The overall objectives of dynamics fluid mechanics course are to give students a solid foundation in the fundamentals of Dynamics fluid mechanics, problem-solving skills, practical knowledge, and a mindset for further learning and using fluid mechanics in diverse engineering situations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The course objectives will be communicated via a variety of teaching methods. There will be PPT presentations for the chapter headings, definitions, graphs, and several helpful images, as well as a summary at the end of each chapter. The PPT provides details on brand-new subjects and unsolved examples, which will be solved on the whiteboard and shown for students to view
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	
	Assignments	2	10% (10)	2, 12	
	Projects				
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental of Flow & Kinematics: Basic definitions of the parameters and terms that govern the flow of fluid are given in this section, such as; acceleration field, rotational and irrotational, etc.
Week 2	Fundamental of Flow & Kinematics: Basic definitions of the parameters and terms that govern the flow of fluid are given in this section, such as; Circulation, Flow lines: pathline, streamline, streakline. Flow visualization etc.
Week 3	Control Volume Relation for Fluid Analysis: The definition of control volume and basic derivatives of the equations of conservations (conservation of mass and momentum).
Week 4	Control Volume Relation for Fluid Analysis: The definition of control volume and basic derivatives of the equations of Energy (conservation of energy), Euler, and Bernoulli equations.
Week 5	Control Volume Relation for Fluid Analysis: Applications of Bernoulli equations and applications of momentum equation of stationary and moving blades.
Week 6	Control Volume Relation for Fluid Analysis: More applications of momentum equation of stationary and moving blades.
Week 7	Viscous Internal Flow: Laminar and turbulent fully developed flow between parallel plates and inside pipes.
Week 8	Viscous Internal Flow: Friction factor and its relations with Reynolds number (in laminar flow) and with pipe roughness in addition.
Week 9	Viscous Internal Flow: Darcy Weizbach relation is explained and used to calculate the friction factor (Major Losses).
Week 10	Viscous Internal Flow: Minor losses, in fittings such as valves, reduces, expanders, filters, elbows are studied and have to be included in the determination of the overall losses.
Week 11	Viscous Internal Flow: More on Minor losses, in fittings such as valves, reduces, expanders, filters, elbows are studied and have to be included in the determination of the overall losses. Multi pipes systems are analyzed.



Week 12	Boundary Layer: The definition of boundary layer flow, boundary layer thickness, displacement thickness, and momentum thickness.
Week 13	Boundary Layer: Laminar and turbulent boundary layer over a flat plate, Von Karman theory.
Week 14	Flow Measurements: Meters like, Electromagnetic flow meter, ultrasonic flow meter, hotwire flow meter, etc.
Week 15	Flow Measurements: The principles of the differential pressure flow meters. Other types of flow
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Fluid properties.
Week 2	Dead weight calibrated.
Week 3	Manometers.
Week 4	Visualization of the flow in the channels.
Week 5	Visualization of the flow in the channels.
Week 6	Pitot static tube.
Week 7	Pitot static tube.
Week 8	Bernoulli's Theorem Demonstration.
Week 9	Bernoulli's Theorem Demonstration.
Week 10	Reynolds number.



Week 11	Reynolds number.
Week 12	Flow meter measurement.
Week 13	Flow meter measurement.
Week 14	Wears.
Week 15	Wears.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Fluid Mechanics. C. Hibbeler 2. Fluid Mechanics. Frank M. WHITE 3. Fundamental of fluid mechanics. munson, okllohi	Yes
Recommended Texts	Manual for Lab.	Yes
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 المعالجة)	(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.



Semester four	Thermodynamics II	ME223
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Thermodynamics II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME223		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ali Hussein Jabbar Al-Jubainawi	e-mail	alihussein.mcm@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	4/07/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	- Thermodynamics I	Semester	1
	- Air Conditioning and Refrigeration		2



Co-requisites module		Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 6.To provide students with the ability to integrate the principles of classical thermodynamics and fluid mechanics in order to provide a foundation for the subsequent analysis of industrial plant and process equipment. 7.To ensure all students can approach thermodynamic analysis of systems in a logical and methodological manner. 8.To understand the laws of thermodynamics and an appreciation of their consequences. 9.To develop some elementary analysis skills using the second laws of thermodynamics. 10. To deeply know the thermal engineering systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. To introduce the fundamentals of heat engine. 2. To review the basic concepts of thermodynamics. 3. To use the thermodynamic relations, graphs and tables to calculate the various state entities. 4. To explain how the most common thermodynamic machines work, such as Otto, Diesel, Clausius-Rankine and Brayton. 5. To explain the principles of steam cycle process (Clausius-Rankine), gas turbine process (Brayton) and the internal combustion engine (Otto and Diesel) and solve problems related to these processes and principles applied to increase efficiency. 6. To determine the coefficient of performance of refrigerators and heat pumps and compare with refrigerators and heat pumps operating on the reversed Carnot cycle. 7. To plot processes on both P-V and T-S diagrams. 8. To analyze systems Air Conditioning processes through the application of the laws of thermodynamics. 9. To apply both the first and second laws to determine heat transfer, work, and property changes during processes occurring in both closed and open systems.



	10. To explain the behavior of gas mixtures in thermodynamic system.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: The heat engine cycle (6hr), Air sundered cycle (9hr), Reversed Carnot cycle (6hr), Steam power plant (6hr), Positive displacement compressors (9hr), Gas mixture (9hr),

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple experiments that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method.



Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6, 7 and 13
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 11 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: The heat engine cycle The heat engine cycle - Carnot cycle and perfect gas.
Week 2	Chapter One: The heat engine cycle The heat engine cycle – Brayton's cycle.
Week 3	Chapter Two: Air sundered cycle Air sundered cycle – Otto cycle.
Week 4	Chapter Two: Air sundered cycle Air sundered cycle – Diesel cycle.
Week 5	Chapter Two: Air sundered cycle Air sundered cycle – Dual combustion cycle.
Week 6	Chapter Three: Reversed Carnot cycle Air refrigerator working on reversed Carnot cycle.
Week 7	Chapter Three: Reversed Carnot cycle Refrigeration Cycles.
Week 8	Chapter Four: Steam power plant The simple Rankin cycle.
Week 9	Chapter Four: Steam power plant Rankin cycle with superheat
Week 10	Chapter Five: Positive displacement compressors Reciprocating machines.
Week 11	Chapter Five: Positive displacement compressors The conditions for minimum work, isothermal efficiency and volumetric efficiency.
Week 12	Chapter Five: Positive displacement compressors Multi-stage compression.
Week 13	Chapter Six: Gas mixture Dalton's law, Gibbs Dalton law and volumetric analysis of a gas mixture
Week 14	Chapter Six: Gas mixture Molecular weight, gas constant and specific heats of gas mixture
Week 15	Chapter Six: Gas mixture Adiabatic mixing of gas mixture



Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Know to the different measurement instruments.
Week 2	Lab 2: Know to the different measurement instruments.
Week 3	Lab 3: Determination of specific heat capacity of liquids
Week 4	Lab 4: Determination of specific heat capacity of liquids
Week 5	Lab 5: Determination of specific heat capacity of solids
Week 6	Lab 6: Determination of specific heat capacity of solids.
Week 7	Lab 7: Experimental investigation of Boyle's Law and atmospheric pressure.
Week 8	Lab 8: Experimental investigation of Boyle's Law and atmospheric pressure.
Week 9	Lab 9: Coefficient of linear expansion of metals.
Week 10	Lab 10: Coefficient of linear expansion of metals.
Week 11	Lab 11: Thermocouple Voltages
Week 12	Lab 12: Thermocouple Voltages
Week 13	Lab 13:Review
Week 14	Lab 14:Examination
Week 15	Lab 15:Final examination



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	4. Text of lectures. 5. Rajput, R.K., 2005. A textbook of engineering thermodynamics. Laxmi Publications. 6. Borgnakke, C. and Sonntag, R.E., 2022. Fundamentals of thermodynamics. John Wiley & Sons.	Yes
Recommended Texts	3. Rajput, R.K., 2005. Thermal engineering. Firewall Media. 4. Khurmi, R.S. and Gupta, J.K., 2008. A textbook of thermal engineering. S. Chand Publishing.	yes
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 المعالجة)	(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.



Semester four	Strength of Materials	ME224
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Strength of Materials		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME224		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader	Noor Kadhim Faheed	e-mail	Noor.kf@uomisan.edu.iq
Module Leader's Acad. Title	Teacher	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mechanics of Materials	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	As the engineering design of different components, structures etc. used in practice are done using different kinds of materials, it is essential to understand the basic behavior of such materials
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Lectures series on Strength of Materials are prepared, explaining the fundamentals in a simple and lucid manner so that the students can grasp the basics of the application of loading system and its consequence in a deformable body.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	2, 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction to Torsion • Simple torsion theory • Polar Second Moment of Area • Polar Section Modulus Composite Shafts
Week 2	Chapter One: Introduction to Torsion • Combined Stress Systems • Combined Bending and Torsion • Combined Bending
Week 3	Chapter One: Introduction to Torsion • Torsion and Direct Thrust • Shafts With Bolt Coupling • Torsion of Non-Circular
Week 4	Chapter Two: Introduction to Stress and Strain Analysis • Stress Analysis, • Stresses on Oblique Planes • Direct Stress • quiz
Week 5	Chapter Two: Introduction to Stress and Strain Analysis • Material subjected to pure shear • Material subjected to two mutually perpendicular direct stresses • Material subjected to combined direct and shear stresses • quiz
Week 6	Chapter Two: Introduction to Stress and Strain Analysis • Principal plane inclination in terms of the associated principal stress • Graphical solution - Mohr's stress circle Strain Analysis • Linear strain for bi- and tri-axial stress state
Week 7	Chapter Three: Introduction to Stress and Strain Analysis • Average temperature • Laminar and turbulent flow in tubes
Week 8	Chapter Three: Introduction to Stress and Strain Analysis • Principal strains in terms of stresses , Bulk modulus K And Volumetric strain , Relationship between the elastic constants E, G, K and ν • Strains on an oblique plane (direct and shear)



Week 9	Chapter Three: Introduction to Stress and Strain Analysis - Principal strain- Mohr's strain circle - Relationship between Mohr's stress and strain circles - quiz
Week 10	Chapter Four: Introduction to Strain energy - Strain energy for different kind of loading - suddenly applied loads - Quiz.
Week 11	Chapter Four: Introduction to Strain Energy Castigliano's first theorem for deflection.
Week 12	Chapter Four: Introduction to Thin Cylinder - Thin cylinders under internal pressure - Hoop or circumferential stress - Longitudinal stress - Changes in dimensions
Week 13	Chapter Five: Introduction to Thin Cylinder - Thin spherical shell under internal pressure - Change in internal volume - Vessels subjected to fluid pressure - Cylindrical vessel with hemispherical ends - Wire-wound thin cylinders
Week 14	Chapter Five: Introduction to Thick Cylinders - Development of the Lamé theory - Thick cylinder - internal pressure only , - Longitudinal stress - Change of cylinder dimensions - Compound cylinders.
Week 15	Chapter Five: Introduction to Struts - Euler's theory - Euler "validity limit" - Rankine or Rankine-Gordon formula.
Week 16	Preparatory week before the 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	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	- Strength of Materials 3rd Edition. - Mechanics of Materials, Ninth Edition, 2014, Published by Pearson Prentice Hall R.C. Hibbeler	Yes
Recommended Texts	- Mechanics of Materials, Seventh Edition, 2015 Published by McGraw-Hill Education - Ferdinand P. Beer E. Russell Johnston, Jr. - John T. DeWolf - David F. Mazurek	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 المعالجة)	(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.				



Semester four	Engineering Metallurgy	ME225
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Metallurgy		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ME225		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ali Husien Hasan	e-mail	al-azzawwi@uomisan.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	2
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	After taking this module the student will be able: 1. To recognize the Mechanical properties of metals and alloys. 2. To learn the thermal equilibrium diagrams. 3. Learn about plain carbon steel and its heat treatment. 4. The types of alloy steels. 5. Understand the cast iron and non-ferrous metals and alloys. 6. Understand the polymers and their properties. 7. The corrosion types, mechanism, and damage.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The outcome of this module is graduate a mechanical engineer can deal with different types of steels, non-ferrous materials and polymers in addition to their mechanical properties. The corrosion types and its mechanism and damage are also what the engineer should know about.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Giving sufficient information about the engineering materials and their use and mechanical properties. Polymers as important materials should the student know about them. Finally, the mechanism of corrosion damage initiation also the students should have the basic information about it.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	All
	Assignments	2	10% (10)	7, 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	2,4,6,8,10 and 12	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Structure of Materials. • Atomic, bonding and crystallographic structure. • Macro and Micro structure of ingots and castings.
Week 2	Chapter Two: Mechanical properties and plastic deformation. • Tension and Hardness tests. • Elastic and Plastic Deformation.
Week 3	Chapter Two: Mechanical properties and plastic deformation. • Dislocation theory of slip. • Deformation by twin • Cold working and its effect. • Hot working.
Week 4	Chapter Three: Alloys and Thermal Equilibrium Diagrams (TEDs). • Strengthen by alloying. • Solid solution. • Intermetallic compounds. • Eutectic and Eutectoid.
Week 5	Chapter Three: Alloys and Thermal Equilibrium Diagrams (TEDs).. • Types of Thermal Equilibrium Diagrams • Solid solution type, combination type, peritectic type and intermetallic compound type. • Quiz
Week 6	Chapter Four: Plain Carbon Steel (PCS). • Steel making and mechanical properties of Plain Carbon Steel. • Structure of Plain Carbon Steel (PCS). • The steel portion of the iron-Carbon Diagram.
Week 7	Chapter Four: Plain Carbon Steel (PCS). • Effect of other elements present in PCS. • Classification and use of PCS. • The complete Iron-Carbon Diagram.
Week 8	Chapter Five: Heat Treatment of Plain Carbon Steel. • Annealing (process annealing, and Full annealing. • Spheroidisation. And Normalizing. • Hardenability, the end quench test of hardenability.



	• Tempering
Week 9	Chapter Five: Heat Treatment of Plain Carbon Steel. • The isothermal transformation of austenite. • Mart-tempering. • Austempering..
Week 10	Chapter Six: Alloy Steels. • Effect of alloying elements. • Manganese steels. • Nickel steels. • Chromium steels. • Low alloy Nickel-Chromium steels. • Quiz.
Week 11	Chapter Six: Alloy Steels. • Silicon steels. • Stainless steels. • Heat resisting steels. • High speed tool steels. • Magnetic alloys.
Week 12	Chapter Seven: Cast Iron. • White and Grey cast irons. • Structure of grey cast iron. • Malleable cast iron. • Inoculated high duty cast iron. • Spheroidal graphite cast iron. • Alloy cast irons. • Heat treatment of cast iron.
Week 13	Chapter Eight: Non-ferrous metals and alloys. • Copper and Copper alloys. • Aluminum and Aluminum alloys. • Zinc and its alloys.
Week 14	Chapter Nine: Polymers • Polymer characterization. • Synthetic and properties of polymers. • Polymer blends and composites. • Polymer processing and testing.
Week 15	Chapter Ten: Corrosion. • Corrosion types and mechanisms. • Corrosion damage.
Week 16	Preparatory week before the final Exam



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab. 1: Introduction to Lab and equipment.
Week 2	Lab. 2: Preparing samples for microscopic investigation (cutting, mounting, grinding, and polishing).
Week 3	Lab. 3: Microscopic Testing different steel microstructures.
Week 4	Lab. 4: Preparing Samples for tensile and torsional tests.
Week 5	Lab. 5 Microscopic Investigation of alloy microstructure.
Week 6	Lab. 6 Tensile Test and mechanical properties.
Week 7	Lab. 7 Investigation the effect of heat treatment on the material microstructure.
Week 8	Lab 8: Torsional Test of materials.
Week 9	Lab 4: Vickers and Rockwell Hardness measurements for different materials. .
Week 10	Lab 5: Brinell Hardness and relations between hardness measurements.
Week 11	Lab 6: Longitudinal Thermal Expansion of different materials.
Week 12	Lab 12: Microscopic Investigation of Cast Irons.
Week 13	Lab 13: Review.
Week 14	Lab 14: Preparing for Examination.
Week 15	Lab 15: Final examination.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	Physical Metallurgy Principles, by Reza Abbaschian, Robert E. Reed-Hill, and Richard E. Smallman	Yes
Recommended Texts	1. Introduction to the Physical Metallurgy of Welding by Sidney H. Avner. 2. ASM Handbooks: The American Society for Metals (ASM) publishes a series of authoritative handbooks on various aspects of materials science and engineering.	yes
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 المعالجة)	(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.				



Semester four	The crimes of the Baath regime in Iraq	MNS120
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	The crimes of the Baath regime in Iraq		Module Delivery
Module Type	S		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MNS120		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	2
Administering Department	Mechanical Engineering	College	College of Engineering
Module Leader	Dr. Sabah F. H. Alhamdi	e-mail	E-mail: sabahalhamdi@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Jaber	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	25/06/2023	Version Number	1.0



Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The overall objectives of Human Rights and Democracy course are to give students a solid foundation in the fundamentals of Human Rights and Democracy, problem-solving skills, practical knowledge, and a mindset for further learning and using Human Rights and Democracy in diverse community habits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	The course objectives will be communicated via a variety of teaching methods. There will be PPT presentations for the chapter headings, definitions, and several helpful images, as well as a summary at the end of each chapter.



	The PPT provides details on brand-new subjects and unsolved examples, which will be solved on the whiteboard and shown for students to view
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	35	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	40	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	
	Assignments	2	10% (10)	2, 12	
	Projects				
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Fundamental of freedom
Week 2	1. Intellectual freedom and cultural
Week 3	2. Freedom of politics, Economic and Social freedom
Week 4	3. Freedom of politics, Economic and Social freedom
Week 5	4. The future of public freedoms
Week 6	5. Universal Declaration of Human Rights and Freedoms
Week 7	6. Universal Declaration of Human Rights and Freedoms
Week 8	7. Freedom in Islam
Week 9	8. A brief explanation of the types of democracy
Week 10	Democracy and the entrance to it.
Week 11	Applications of democracy.
Week 12	4. Administrative and financial corruption
Week 13	5. Administrative and financial corruption
Week 14	Democracy in Islam
Week 15	Preparatory before the final Exam
Week 16	More preparatory before the final Exam



Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي

	Material Covered
Week 1	مفهوم الجريمة واقسامها + تعريف الجريمة لغة واصطلاحا
Week 2	اقسام الجرائم + جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا
Week 3	انواع الجرائم الدولية+ القرارات الصادرة من السلطة الجنائية العليا
Week 4	الجرائم النفسية والاجتماعية واثارها ، وأبرز انتهاكات النظام البعثي في العراق
Week 5	اليات الجرائم النفسية, اثار الجرائم النفسية
Week 6	الجرائم الاجتماعية , عسكرة المجتمع
Week 7	موقف النظام البعثي من الدين
Week 8	انتهاكات القوانين العراقية
Week 9	صور انتهاكات حقوق الانسان وجرائم السلطة
Week 10	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث , اماكن السجون والاحتجازات لنظام البعث
Week 11	الجرائم البيئية لنظام البعث في العراق , التلوث الحربي والاشعاعي وانفجار الالغام
Week 12	(تدمير المدن والقرى (سياسة الارض المحروقة, تجفيف الاهوار
Week 13	تجريف بساتين النخيل والمزروعات
Week 14	جرائم المقابر الجماعية , اهداف مقابر الابداء الجماعية المرتكبة من نظام البعث في العراق
Week 15	(التصنيف الزمني لمقابر الابداء الجماعية في العراق للمدة (1963-2003)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The crimes of the Baath regime in Iraq	Yes
Recommended Texts		Yes
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 المعالجة)	(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.				



Semester two	Computer II	UOM201
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer II		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM201		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammed Tali Qasim	e-mail	Mohammed.almalchy@uomisan.edu.iq
Module Leader's Acad. Title	lecture	Module Leader's Qualification	Master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	2/07/2023	Version Number	1.0

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



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Introduce students to the concepts of modern computer networks and Internet technologies. 1- Familiarize students with the principles of electronic commerce (E-commerce) and cloud computing. 2-Introduce students to the fundamental concepts of Artificial Intelligence (AI) and its applications. 3- Develop students' skills in using Artificial Intelligence applications responsibly and effectively. 4- Increase students' awareness of the ethical and social aspects of Artificial Intelligence. 5- Prepare students to keep pace with emerging digital technologies and their applications in academic and professional environments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Use cloud computing services for storing, accessing, and sharing digital resources. 1. Utilize Artificial Intelligence tools to support learning, research, and problem-solving. 2. Evaluate the credibility and reliability of electronic information sources. 3. Apply e-commerce applications and services in practical scenarios. 4. Use Artificial Intelligence tools ethically and responsibly in accordance with professional standards. 5. Prepare professional presentations and technical reports using modern digital tools. 6. Collaborate effectively using cloud-based platforms and online collaborative applications.
Indicative Contents المحتويات الإرشادية	Unit 1: Computer Networks Introduction to computer networks Types of computer networks Importance and applications of computer networks Network components and communication devices Communication protocols Fundamentals of network security Unit 2: Electronic Commerce Concepts and characteristics of e-commerce Types of e-commerce (B2B, B2C, C2C, and C2G)



	Applications of e-commerce Electronic payment systems Security of electronic transactions Advantages and challenges of e-commerce Unit 3: Computer Troubleshooting and Maintenance Introduction to computer troubleshooting Types of computer faults Hardware troubleshooting Software troubleshooting Operating system troubleshooting Network troubleshooting Diagnostic and maintenance tools Preventive maintenance and best practices Unit 4: Fundamentals of Artificial Intelligence Introduction to Artificial Intelligence Basic concepts and terminology AI techniques and methodologies Fields of AI applications Unit 5: Artificial Intelligence Applications AI applications in everyday life AI in smart devices and virtual assistants AI applications in education and healthcare AI applications in business, industry, finance, marketing, and transportation Advanced AI applications in cybersecurity, smart cities, and the Internet of Things (IoT) Unit 6: Artificial Intelligence and Society Economic and social impacts of Artificial Intelligence AI and the future of work Ethical issues in Artificial Intelligence Privacy, bias, fairness, and transparency in AI systems Future trends and emerging developments in Artificial Intelligence
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استراتيجيات التعلم والتعليم	
Strategies	The course adopts a student-centered learning approach that combines theoretical knowledge with practical applications. The following teaching strategies are employed: 1-Interactive Lectures: to introduce fundamental concepts of computer networks, e-commerce, computer troubleshooting, and artificial intelligence. 2- Laboratory-Based Learning: to provide hands-on experience in network configuration, computer maintenance, troubleshooting techniques, and the use of AI applications. 3-Demonstrations and Guided Practice: using modern software tools, online services, and AI platforms to reinforce theoretical concepts. 4- Problem-Based Learning (PBL): through practical troubleshooting scenarios, case studies, and real-world computing problems. 5- Collaborative Learning: by engaging students in group discussions, teamwork, and collaborative problem-solving activities. 6- Case Studies: to analyze practical applications of e-commerce, cybersecurity, and artificial intelligence in engineering and society. 7- Project-Based Learning where students complete practical assignments involving networking concepts, AI tools, and digital technologies. 8- Self-Directed Learning: by encouraging students to explore emerging technologies, online learning resources, and current developments in computing. 9- Class Discussions and Presentations: to enhance communication skills and encourage critical thinking about the social, ethical, and professional implications of artificial intelligence. 10- Continuous Formative Assessment: through quizzes, laboratory exercises, homework assignments, and classroom activities to monitor student progress and provide timely feedback.

Student Workload (SWL)



الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 4, 6 and 7
	Assignments	2	20% (20)	2, 12	LO # 5,7 and 8
	Projects/ Lab				
	Report	1	10% (10)	13	LO #2, 8
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 4,6,7 and 8
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction to Computer Networks, Types of Networks, and Their Importance.
Week 2	Network Components, Networking Devices, Communication Protocols, and Network Security.
Week 3	Electronic Commerce (E-Commerce): Concepts, Characteristics, Types, Areas of Application, Electronic Payment Systems, Security of Electronic Transactions, Advantages and Challenges of E-Commerce.



Week 4	Computer Troubleshooting: Types of Computer Faults, Troubleshooting Methodology, Hardware and Software Problems.
Week 5	Troubleshooting Operating System and Network Problems, Maintenance Tools, Preventive Maintenance, and Best Practices.
Week 6	Introduction to Artificial Intelligence (AI), Basic Concepts, and Areas of Application.
Week 7	Artificial Intelligence Techniques and Methods.
Week 8	Midterm Examination.
Week 9	Artificial Intelligence in Everyday Life: Smartphones, Intelligent Assistants, Machine Translation, and Recommendation Systems.
Week 10	Artificial Intelligence Applications in Education and Healthcare.
Week 11	Artificial Intelligence Applications in Business, Industry, Finance, Marketing, and Transportation.
Week 12	Advanced Artificial Intelligence Applications in Cybersecurity, Smart Cities, and the Internet of Things (IoT).
Week 13	Artificial Intelligence and Society: Economic and Social Impacts, and the Future of the Labor Market.
Week 14	Ethics of Artificial Intelligence: Privacy, Bias, and Transparency.
Week 15	The Future of Artificial Intelligence.
Week 16	Preparatory Week Before the Final Examination.

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي العملي	
Week	Material Covered
Week 1 – Lab 1	Introduction to network components, connecting network devices, and configuring basic network settings.
Week 2 – Lab 2	Network configuration, connectivity testing, and the use of network diagnostic tools.
Week 3 – Lab 3	Exploring e-commerce platforms, user registration, and utilizing online services.
Week 4 – Lab 4	Practical applications of electronic payment methods and digital wallets.



Week 5 – Lab 5	Introduction to Artificial Intelligence tools and hands-on experience with selected AI applications for education.
Week 6 – Lab 6	First Practical Examination.
Week 7 – Lab 7	Practical applications of Artificial Intelligence tools in education and data analysis.
Week 8 – Lab 8	Hands-on applications for content creation and data analysis using Artificial Intelligence tools.
Weeks 9– 13 – Labs 9–13	Development and implementation of a mini-project using an Artificial Intelligence tool.
Week 14 – Lab 14	Discussion of case studies and presentation of students' projects.
Week 15 – Lab 15	Final Practical Examination and Project Presentations.
Week 1 – Lab 1	Introduction to network components, connecting network devices, and configuring basic network settings.
Week 2 – Lab 2	Network configuration, connectivity testing, and the use of network diagnostic tools.
Week 3 – Lab 3	Exploring e-commerce platforms, user registration, and utilizing online services.
Week 4 – Lab 4	Practical applications of electronic payment methods and digital wallets.
Week 5 – Lab 5	Introduction to Artificial Intelligence tools and hands-on experience with selected AI applications for education.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	- Ahmed Banafa :Introduction to Artificial Intelligence (AI), 1st Edition, 2024.	Yes
Recommended Texts	- الخضر علي الخضر: أساسيات الحاسوب، 2016. - الدكتور عادل عبدالله: مدخل إلى عالم الذكاء الاصطناعي، 2005	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 المعالجة)	(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.				



Semester two	English Language II	UOM202
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English Language II		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM202		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammed Tali Qasim	e-mail	Mohammed.almalchy@uomisan.edu.iq
Module Leader's Acad. Title	lecture	Module Leader's Qualification	Ph.D
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	2/07/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	English Language	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Develop students' proficiency in using English grammar accurately in academic and technical contexts. 2. Enhance students' reading comprehension skills through engineering texts related to Mechanical Engineering. 3. Equip students with technical vocabulary and terminology commonly used in engineering disciplines. 4. Develop students' writing skills by enabling them to produce grammatically correct sentences, coherent paragraphs, and technical responses in English. 5. Improve students' oral communication skills through classroom discussions, presentations, and interactive learning activities. 6. Enable students to use English effectively in engineering workplace environments, particularly in topics related to engineering materials, drilling machines, automotive engines, and occupational safety. 7. Prepare students to read, understand, and utilize technical books, manuals, research papers, and reference materials written in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the fundamental and advanced English grammar structures covered in the course. 2. Distinguish between different grammatical structures and apply them correctly. 3. Identify technical terminology related to Mechanical Engineering. 4. Comprehend technical texts related to engineering materials, automotive engines, and drilling machines. 5. Interpret occupational health and safety instructions written in English. 6. Apply English grammar accurately in both spoken and written communication. 7. Read, comprehend, and analyze technical texts related to engineering.



	8. Write short answers, reports, and technical paragraphs in English. 9. Use technical vocabulary appropriately in discussions and professional communication. 10. Communicate effectively in English in academic and engineering-related situations. 11. Describe engineering equipment, materials, and safety procedures using appropriate technical English. 12. Work collaboratively in teams to complete language-based and technical learning activities.
Indicative Contents المحتويات الإرشادية	Unit 1: English Grammar Linking words and connectors Comparative and superlative forms Subject–verb agreement Modal verbs (should, could, would) Reported speech Unit 2: Sentence Structure and Academic Writing Word order Relative clauses Infinitives and gerunds Expressing permission, obligation, and prohibition Writing grammatically correct sentences and paragraphs Unit 3: Technical English for Mechanical Engineering Engineering materials and their properties Technical vocabulary related to Mechanical Engineering Reading and understanding engineering texts Unit 4: Mechanical Equipment Drilling machines Automotive engines Components, operation, and applications Technical descriptions of mechanical equipment Unit 5: Occupational Health and Safety Safety regulations and procedures Hazard identification Personal protective equipment (PPE) Safety instructions in engineering workplaces Unit 6: Technical Reading and Communication



	Reading and analyzing technical texts Engineering terminology Technical discussions and oral presentations Academic communication in engineering contexts Unit 7: Technical Writing Writing technical paragraphs Short technical reports Answering technical questions Preparing engineering documents using appropriate technical vocabulary
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course adopts a learner-centered approach that integrates language development with technical and engineering contexts. The following learning and teaching strategies are employed: 1. Interactive Lectures to explain English grammar, technical vocabulary, and language structures used in academic and engineering contexts. 2. Communicative Language Teaching (CLT) to improve students' speaking, listening, reading, and writing skills through meaningful communication. 3. Reading-Based Learning using technical texts related to Mechanical Engineering, including engineering materials, drilling machines, automotive engines, and occupational safety. 4. Collaborative Learning through pair work, group discussions, and teamwork to enhance communication and problem-solving skills. 5. Task-Based Learning (TBL) by engaging students in practical language tasks such as reading comprehension, report writing, and technical presentations. 6. Presentation-Based Learning to develop students' oral communication skills by presenting engineering topics in English. 7. Writing Practice through structured exercises, paragraph writing, technical reports, and grammar-based assignments. 8. Vocabulary-Building Activities to strengthen students' knowledge and use of technical terminology related to Mechanical Engineering. 9. Self-Directed Learning by encouraging students to use dictionaries, technical references, digital learning resources, and online language tools to improve their language proficiency. 10. Continuous Formative Assessment through quizzes, classroom activities, presentations, homework assignments, and regular feedback to monitor students' progress and improve learning outcomes.



Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 4, 6 and 7
	Assignments	2	20% (20)	2, 12	LO # 5,7 and 8
	Projects/ Lab				
	Report	1	10% (10)	13	LO #2, 8
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 4,6,7 and 8
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Unit One: Language and Grammar – Linking Words (Reasons and Results), Adding, Organizing, and Summarizing.
Week 2	Contrasting Ideas, Comparative and Superlative Forms, So, Neither, and Too.



Week 3	Verbs followed by Infinitives or Gerunds (-ing), Permission, Obligation and Prohibition, Relative Clauses, Word Order, Too and Enough, Some/Any/No, Subject–Verb Agreement, Modal Verbs (Should, Could, Would), Reported Speech, and Practice Exercises.
Week 4	Unit Two: Technical Language – Materials – Lesson Introduction, Learning Objectives, Technical Vocabulary, and Reading Activity.
Week 5	Writing Activity, Speaking Activity, and Grammar Activity.
Week 6	Evaluation Activity, Performance Assessment, Written Test, and Review of Unit Two.
Week 7	Unit Three: Technical Language – Drilling Machine – Lesson Introduction, Learning Objectives, Technical Vocabulary, and Reading Activity.
Week 8	Midterm Examination.
Week 9	Writing Activity, Speaking Activity, and Grammar Activity.
Week 10	Performance Assessment, Written Test, and Review of Unit Three.
Week 11	Unit Four: Technical Language – Automotive Engine – Lesson Introduction, Learning Objectives, Reading Activity, and Technical Vocabulary.
Week 12	Writing Activity, Speaking Activity, and Grammar Activity.
Week 13	Performance Assessment, Written Test, and Review of Unit Four.
Week 14	Unit Five: Health and Safety at Work – Lesson Introduction, Reading Activity, Technical Vocabulary, and Writing Activity.
Week 15	Speaking Activity, Grammar Activity, Review Activity, Performance Assessment, and Written Test.
Week 16	Preparatory Week Before the Final Examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	-English II for Mechanical Engineering (Departmental Course Notes). -Raymond Murphy, English Grammar in Use, Cambridge University Press. -Mark Ibbotson, Professional English in Use: Engineering, Cambridge University Press.	Yes



Recommended Texts	-Eric H. Glendinning & Norman Glendinning, Oxford English for Careers: Technology 1, Oxford University Press. -Eric H. Glendinning & Alison Pohl, Oxford English for Careers: Technology 2, Oxford University Press. -Technical manuals and engineering reference books related to Mechanical Engineering.	No
Websites	Cambridge Dictionary English Dictionary, Translations & Thesaurus	

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 المعالجة)	(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.				



Semester Five

Semester five	Engineering Analysis	ENG311
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Analysis		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENG311		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3		
Semester of Delivery		1	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammad Mahdie Saleh Al-Azawii	e-mail	Mohammed.alazawii@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Apply complex variable techniques to solve engineering problems, including complex integration and conformal mappings. 2. Understand the properties and applications of special functions (Gamma function). 3. Understand the concept and properties of Fourier series representation. 4. Apply Fourier series to analyze periodic functions and solve engineering problems involving periodic phenomena. 5. Explore the properties and applications of odd and even functions. 6. Apply half-range series to analyze and approximate even and odd functions. 7. Understand the concept of complex Fourier series and its applications. 8. Apply half-range expansion to analyze and approximate complex periodic functions. 9. Gain knowledge of Fourier integration techniques and their applications in solving differential equations. 10. Understand the concept and properties of Laplace transformation. 11. Gain proficiency in Laplace transformation techniques and their applications in solving initial value problems of ordinary differential equations (ODEs). 12. Understand and solve ordinary differential equations using Laplace transform and D-operator.
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	13. Develop an understanding of Bessel functions and Legendre functions. 14. Develop an understanding of partial differential equations and their classifications. 15. Apply partial differential equations to model and solve engineering problems. 16. Study the characteristics and solve the wave partial differential equations by separation of variables. 17. Understand the characteristics and solve heat partial differential equations by separation of variables. 18. Understand the probability and statistics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, student should be able to: 1- Analyze and solve engineering problems using complex variable techniques, including complex integration and conformal mappings. 2- Understand and apply special functions, such as Gamma, function, to solve mathematical and engineering problems effectively. 3- Analyze and solve engineering problems using Fourier series, understanding the representation and properties of periodic functions and their applications in engineering. 4- Apply concepts of odd, even functions, and half-range series to approximate and analyze engineering problems involving even functions. 5- Utilize complex Fourier series and half-range expansion to analyze and approximate complex periodic functions encountered in engineering. 6- Utilize Laplace transformation methods to solve ordinary differential equations (ODEs), including initial value problems, and interpret the results in engineering contexts. 7- Analyze and solve engineering problems involving partial differential equations, understanding their classifications and selecting appropriate solution techniques. 8- Apply solutions of wave partial differential equations to analyze and model wave phenomena encountered in engineering systems. 9- Apply solutions of heat partial differential equations to analyze and model heat transfer phenomena in engineering systems.



Indicative Contents

المحتويات الإرشادية

1. Complex Variables and Functions:

Complex Functions, Special Complex Functions, Continuity and Differentiation, Cauchy-Riemann Equations, Complex Integration, Contour Integration, Conformal Mapping

2. Fourier Series and Integral:

Fourier Series, Sine and Cosine Fourier Series, Complex Fourier Series, Odd and Even Functions and Half Range Expansion, Fourier Integral.

3. Laplace Transform:

Laplace Transform, Laplace Transform of Derivatives and Integrals, Laplace Transform of Special Functions, Inverse Laplace Transform.

4. Solution of Ordinary Differential Equations:

Ordinary Differential Equations, Solution of ODE using Laplace Transform, Solution of Ordinary Differential Equations using D-Operator Bessel Functions, Legendre Functions.

5. Partial Differential Equations:

Partial Differential Equation, D-Alembert Solution of the 1-Dim Wave Equation, Using Separation of Variables to Solve PDE, Solution of 1Dim Diffuse Equation.

6. Probability and Statistics:

Statistics and Statistical Variables, Permutations and Combinations, Probability and Distribution



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The module of Numerical Analysis will adopt an interactive learning approach to actively engage students and enhance their critical thinking skills. The main strategy is to encourage student participation through classes, and interactive tutorials. Students will have the opportunity to actively contribute to exercises and discussions, allowing for a deeper understanding of the subject matter. Overall, these learning and teaching strategies are designed to create an engaging learning environment that fosters active participation, critical thinking, and a comprehensive understanding of the concepts covered in the module.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	3, 6, 8, 11 and 13	All
	Assignments	2	10% (10)	4, 10	All
	Projects / Lab.	NA	NA	NA	All
	Report	1	10% (10)	15	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Complex Variables and Functions Complex Functions, Continuity and Differentiation, Cauchy-Riemann Equations, and Complex Integration
Week 2	Chapter One: Complex Variables and Functions Complex Functions, Gamma function
Week 3	Chapter One: Complex Variables and Functions - Contour Integration, Conformal Mapping - Quiz
Week 4	Chapter Two: Fourier Series and Integral Fourier Series, Sine and Cosine Fourier Series
Week 5	Chapter Two: Fourier Series and Integral Complex Fourier Series, Odd and Even Functions and Half Range Expansion



Week 6	Chapter Two: Fourier Series and Integral - Fourier Integral - Quiz
Week 7	Chapter Three: Laplace Transform Laplace Transform, Laplace Transform of Derivatives and Integrals
Week 8	Chapter Three: Laplace Transform - Laplace Transform of Special Functions, Inverse Laplace Transform - Quiz
Week 9	Chapter Four: Solution of Ordinary Differential Equations Ordinary Differential Equations, Solution of ODE using Laplace Transform
Week 10	Chapter Four: Solution of Ordinary Differential Equations Solution of Ordinary Differential Equations using D-Operator
Week 11	Chapter Four: Solution of Ordinary Differential Equations - Bessel Functions and Legendre Functions - Quiz
Week 12	Chapter Five: Partial Differential Equations Partial Differential Equation, D-Alembert Solution of the 1-Dim Wave Equation,
Week 13	Chapter Five: Partial Differential Equations - Using Separation of Variables to Solve PDE, Solution of 1-Dim Diffuse Equation - Quiz
Week 14	Chapter Six: Probability and Statistics Statistics and Statistical Variables,
Week 15	Chapter Six: Probability and Statistics Permutations and Combinations, Probability and Distribution
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week	NA



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Advanced Engineering Mathematics, 10 th edition by Kreyszig, E. Wiley 2011	Yes
Recommended Texts	1- Advanced Engineering Mathematics, by H.K. Dass, 2018, S. Chand Publishing	Yes
Websites	Advanced Engineering Mathematics - YouTube	

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

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Semester five	Heat Transfer I	ME312
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Heat Transfer I		Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME312		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	1
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ahmed Kadhim Alshara	e-mail	dr.ahmed_alshara@uomisan.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Murtadha Saeed Mohammed	e-mail	murtadha.saeed@uomisan.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Be educated on heat transfer methods. 2. Know the laws of heat transfer and their calculations. 3. Develop your understanding of heat transfer system thermal load calculations. 4. Identify the relationships that were examined. 5. Studying the applications of heat transfer 6. Identify the most important design parameters for heat transfer applications and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. List methods of heat transfer. 2. Identify how heat is transferred. 3. Recognize the steady state heat conduction in plane. 4. Recognize the steady state heat conduction in radial bodies. 5. Define the overall heat transfer coefficient. 6. Describe the heat source systems. 7. Discuss and analyze the extended surfaces. 8. Define the thermal contact resistance. 9. Discuss lumped heat-capacity system. 10. Explain the transient heat flow in semi-Infinite solid. 11. Identify physical mechanism and properties of radiation. 12. Define radiation shape factor. 13. Recognize heat exchange between non-black bodies and infinite parallel surfaces. 14. Explain the radiation shields, solar radiation and effect of radiation on temperature measurement
Indicative Contents	The main indicative contents are:



المحتويات الإرشادية	Method of heat transfer and thermal conductivity (6hr), The plane wall (3hr), Radial systems (3hr), Overall heat transfer coefficient and critical thickness of insulation (3hr), Heat source systems (3hr), Extended surfaces (5hr), Thermal contact resistance (1hr), Lumped heat-capacity system (3hr), Transient heat flow in semi-Infinite solid (3hr), Convection boundary conditions (3hr), Physical mechanism and properties of radiation (3hr), Radiation shape factor (3hr), Heat exchange between non-black bodies and infinite parallel surfaces (3hr), Radiation shields, solar radiation and effect of radiation on temperature measurement (3hr).
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple experiments that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6, 7 and 13
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 11, 12 and 14
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction • Method of heat transfer
Week 2	Chapter One: Introduction • Thermal conductivity
Week 3	Chapter Two: Steady state conduction • The Plane wall
Week 4	Chapter Two: Steady state conduction • Radial Systems
Week 5	Chapter Two: Steady state conduction • Overall heat transfer coefficient • Critical thickness of insulation • Quiz
Week 6	Chapter Two: Steady state conduction • Heat source systems
Week 7	Chapter Two: Steady state conduction • Extended surfaces
Week 8	Chapter Two: Steady state conduction • Extended surfaces • Thermal contact resistance
Week 9	Chapter Three: Unsteady state conduction • Introduction • Lumped heat-capacity system
Week 10	Chapter Three: Unsteady state conduction • Transient heat flow in semi-Infinite solid • Quiz.
Week 11	Chapter Three: Unsteady state conduction • Convection boundary conditions
Week 12	Chapter Four: Introduction to Radiation • Physical mechanism • Radiation properties
Week 13	Chapter Four: Introduction to Radiation • Radiation shape factor



Week 14	Chapter Four: Introduction to Radiation - Heat exchange between non-black bodies - Infinite parallel surfaces
Week 15	Chapter Four: Introduction to Radiation - Radiation shields Solar Radiation - Effect of Radiation on Temperature Measurement
Week 16	Preparatory week before the 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	1-Text of lectures	Yes



	2-Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Seventh Edition, 2011.	
Recommended Texts	1.Heat Transfer J. P. Holman, Tenth Edition, 2010. 2.Heat and Mass Transfer Fundamentals & Applications Yunus A. Çengel & Afshin J. Ghajar, fifth Edition, 2015.	Yes
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 المعالجة)	(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.				



Semester five	Theory of Mechanism	ME313
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Theory of Mechanism		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME 313		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	1
Administering Department	Mech. Department	College	Engineering College
Module Leader	Jasim Hasan Ilik	e-mail	j.h.al-bedhany@uomisan.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor	Ali Husien Hasan	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics - Dynamic	Semester	1
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The student will be able to analyze: 1. The linear and angular velocities and accelerations. 2. The CAM and follower movements and design. 3. The gear terminology and stresses due to contact. 4. The role and design of flywheels.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is graduate a mechanical engineer can introduce analyses of different mechanisms and their velocities and accelerations forces and stresses on them.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Encourage the students to analyze the movements of machine components, the role of them and the types of forces acting on them. The mentioned will be achieved through lectures, tutorials, tests, and project in addition to Laboratories.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	78	Structured SWL (h/w)	6
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الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 12	All
	Assignments	1	10% (10)	13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: Introduction to Velocity and Acceleration Diagrams. Introduction to movements (linear and angular.
Week 2	Chapter One: Introduction to Velocity and Acceleration Diagrams.



	• Velocity of points on a rolling body.
Week 3	Chapter Two: Introduction to Velocity and Acceleration Diagrams. • Introduction to Linear and angular accelerations.
Week 4	Chapter Two: Introduction to Velocity and Acceleration Diagrams. • Equivalent linkage and Corioles component. .
Week 5	Chapter Three: Introduction to Cams and followers. • Introduction. • Cams and followers types. • Quiz.
Week 6	Chapter Three: Cams and Followers. • Displacement diagrams. • Types of Motions. • Construction of Cam Profile.
Week 7	Chapter Three: Cams and Followers. • Construction of Cam Profile.
Week 8	Chapter Four: Introduction to Gears • Introduction and gear terminology. • Gear requirements and classifications of gears.
Week 9	Chapter Four: Introduction to Gears • Terms and definitions and analyses procedure. • Contact Ratio and Number of teeth.
Week 10	Chapter Four: Introduction to Gears • Gear Trains.
Week 11	Chapter Five: Flywheels • Introduction. • Flywheel mass.
Week 12	Chapter Five: Flywheels • Flywheels for Internal Combustion Engines. • Quiz.
Week 13	Chapter Five: Flywheels



	TMD and relevant coefficients.
Week 14	Reviewing
Week 15	Chapter Six: Introduction Design of Machines
	Introduction to Design problems.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Velocity of Crank Slider Mechanism.
Week 2	Lab 2: Velocity of Four and Five Members Mechanisms.
Week 3	Lab 3: Acceleration of Crank Slider Mechanism.
Week 4	Lab 4: Acceleration of Four and Five Members Mechanisms.
Week 5	Lab 5: Cams with Simple Harmonic Motion (SHM).
Week 6	Lab 6: Cams with Uniform acceleration and Retardation (UAR).
Week 7	Lab 7: Cam profiles of SHM and UAR.
Week 8	Lab 8: Cam profiles of UAR.
Week 9	Lab 9: Gears and Pinions
Week 10	Lab 10: Classification of Gears.
Week 11	Lab 11: Gear Trains.
Week 12	Lab 12: Flywheels and Mass Moment of Inertia.
Week 13	Lab 13: Review
Week 14	Lab 14: Examination
Week 15	Lab 15: Final examination



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory of Machines by R. S. Khurmi.	Yes
Recommended Texts	1. The theory of Machines by Robert W. Angus First Edition Part I. 2. Theory of Machines and Mechanisms by John J. Dicker, Jordon R. Penock and Joseph E. Shigley	yes
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
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Semester five	Internal Combustion Engines I	ME314
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Internal Combustion Engines I		Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME314		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	1
Administering Department	Mech. Department	College	Engineering College
Module Leader	Sara Jumah Flayh	e-mail	sarajumah@uomisan.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Assist. Lec.
Module Tutor	Sara Jumah Flayh	e-mail	sarajumah@uomisan.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	02/07/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
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			1
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Teaching of fundamentals of internal combustion engines. 2. Analysis of air standard cycles. 3. Engine operation calculations. 4. Description of different engines systems. 5. Studying The Difference between Wankel Engine and reciprocating engine
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Gain knowledge about internal combustion engines. 2. Understanding different between internal combustion engines. 3. Using air standard cycle analysis to calculate thermal properties of engines. 4. Calculation engine operation parameters. 5. Study systems that used to sport engine working. 6. Discuss The Difference between Wankel Engine and reciprocating engine. 7. Gain knowledge about Wankel Engine Performance.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: Introduction to reciprocating engine. Familiarization basic engine nomenclature (3hr), Spark ignition engine (6hr), Rotary engines (3hr), Basic power measurements. Indicated Mean effective pressure (3hr), Indicated power, Brake power, and Friction power. (3hr), Mean effective power and Specific fuel consumption (3hr),



	The Air – Cycle approximation: importance of thermal efficiency. Theoretical cycles. Air – cycle approximations. Air – cycle calculations. Air – cycle efficiency. Effect of engine variables (6hr), Use of the fuel – air cycle. Scope of the fuel – air cycle. (3hr), The Actual Engine Cycle (3hr), Definitions. Reasons for supercharging (3hr), Supercharging of S.I. Engine and Supercharging of Diesel Engines. (3hr), Performance computations and Effects of operating variables on supercharged engines. (3hr), Comparison between Wankel Engine and reciprocating engine. Wankel Engine Performance (3hr).
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Students learn the fundamentals of internal combustion engines, including the difference between S.I. engines and C.I. engines. The difference between both engines according to the work basics and behavior is also considered. Students learn the main parts of the engines. Air standard cycles are taught to students to know the thermal properties and efficiency of engines. Operation calculations including specifications of piston and cylinder, work, power, mean effective pressure, efficiencies are also given as important analyses for engines. and interactive educational programmers.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	78	Structured SWL (h/w)	6.2
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الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 13	1, 2, 3 and 4, 5
	Assignments	2	10% (10)	7, 14	1, 2, 3 and 4, 5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 4
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: Basic Engine types and Their Operation - Introduction to reciprocating engine - Familiarization basic engine nomenclature
Week 2	Chapter One: Basic Engine types and Their Operation Spark ignition engine



Week 3	Chapter One: Basic Engine types and Their Operation Spark ignition engine
Week 4	Chapter One: Basic Engine types and Their Operation Rotary engines
Week 5	Chapter Two: Engine Power and Performance - Basic power measurements. - Indicated Mean effective pressure
Week 6	Chapter Two: Engine Power and Performance - Indicated power - Brake power - Friction power - quiz
Week 7	Chapter Two: Engine Power and Performance - Mean effective power - Specific fuel consumption
Week 8	Chapter Three: Thermodynamics of I.C. Engine - The Air – Cycle approximation: importance of thermal efficiency. - Theoretical cycles. Air – cycle approximations.
Week 9	Chapter Three: Thermodynamics of I.C. Engine - Air – cycle calculations. - Air – cycle efficiency. - Effect of engine variables
Week 10	Chapter Three: Thermodynamics of I.C. Engine - use of the fuel – air cycle. - Scope of the fuel – air cycle
Week 11	Chapter Three: Thermodynamics of I.C. Engine The Actual Engine Cycle
Week 12	Chapter Four: Supercharged Engines and Their Performance - Definitions. - Reasons for supercharging
Week 13	Chapter Four: Supercharged Engines and Their Performance - Supercharging of S.I. Engine - Supercharging of Diesel Engines - Quiz.
Week 14	Chapter Four: Supercharged Engines and Their Performance - Performance computations - Effects of operating variables on supercharged engines
Week 15	Chapter Five: The Wankel Engine - Comparison between Wankel Engine and reciprocating engine. - Wankel Engine Performance



Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1&2	Lab 1: S.I. engines operation.
Week 3&4	Lab 2: C.I. engines operation
Week 5&6	Lab 3: Work
Week 7&8	Lab 4: Power.
Week 9&10	Lab 5: Indicated, brake, friction, parameters.
Week 11&12	Lab 6: Engines exhaust analysis
Week 13	Lab 13:Review
Week 14	Lab 14:Examination
Week 15	Lab 15:Final examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Text of lectures 2- Engineering Fundamentals of the Internal Combustion Engine. Willard W. Pulkrabek. University of Wisconsin.	Yes



Recommended Texts	1. Internal Combustion Engine Fundamentals. John B. Heywood. McGraw-Hill, Inc., New York.	no
Websites	internal combustion engines videos - Bing video	

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 المعالجة)	(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.				



Semester five	Gas Dynamics	ME315
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Gas Dynamics		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME315		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3		
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammad Mahdie Saleh Al-Azawii	e-mail	Mohammed.alazawii@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules	
العلاقة مع المواد الدراسية الأخرى	
Prerequisite module	Semester



Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	10- Deriving the main and basic equations that govern the compressible flow at different flow speeds and conditions starting from thermodynamic and fluid basics. 11- Differentiating the compressible flow into four different flow conditions according to its speed 12- Applying the compressible flow conditions on variable area ducts using ideal flow conditions (isentropic flow). 13- Taking the effect of normal shock wave on the ideal compressible flow in a variable area duct. 14- Taking the effect of friction on the ideal compressible flow in a constant area duct (Fanno duct). 15- Taking the effect of adding or absorbing heat on the ideal compressible flow in a constant area duct (Rayleigh duct). 16- Analyzing the thrust power and propulsive efficiency of turbojet, turbofan, and turbo prop engines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, student should be able to: 1. drive the basic equation that govern compressible flow at specific conditions. 2. differentiate between different compressible flow conditions and cases. 3. find the compressible flow characteristics for the case of ideal flow conditions (isentropic flow) in a variable area duct. 4. find the compressible flow characteristics in case of exposing to a normal shock wave in a variable area duct. 5. find the compressible flow characteristics under different flow conditions taking the effect of friction and heat transfer in a constant area duct. 6. find the propulsive efficiency of turbojet.
Indicative Contents	7. Basics of Compressible Flow:



المحتويات الإرشادية	Course structure, an introduction to the basic equations and relations of compressible flow is clarified to the student. Some thermodynamic relations are reviewed as these relations are used in compressible flow, Stagnation states, Mach waves and Mach cone. 8. Isentropic Flow: Isentropic Flow through variable ducts, Nozzle and Diffusers – The convergent and convergent–divergent nozzles and their applications. Use of Gas tables 9. Normal and Oblique Shocks: Governing equations – Variation of flow parameters across the normal and oblique shocks – Prandtl – Meyer relations – Use of table and charts. 10.Flow Through Ducts: Flows through constant area ducts with Friction (Fanno flow) and Heat transfer (Rayleigh flow) – Use of tables and charts – Generalized gas dynamics. 11.Jet Propulsion: Theory of jet propulsion – Thrust equation – Thrust power and propulsive efficiency – Operation principle, cycle analysis and use of stagnation state performance of turbojet, turbofan and turbo prop engines. Rocket engine.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module of Gas Dynamics will adopt an interactive learning approach to actively engage students and enhance their critical thinking skills. The main strategy is to encourage student participation through classes, and interactive tutorials. Students will have the opportunity to actively contribute to exercises and



	discussions, allowing for a deeper understanding of the subject matter. Overall, these learning and teaching strategies are designed to create an engaging learning environment that fosters active participation, critical thinking, and a comprehensive understanding of the concepts covered in the module.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	3, 6, 9, 12 and 14	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	NA	NA	NA	All
	Report	1	10% (10)	15	All
	Midterm Exam	2 hr	10% (10)	7	All



Summative assessment	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: Basics of Compressible Flow An introduction to the basic equations and relations of compressible flow. Review of some thermodynamic relations which are used in compressible flow
Week 2	Chapter One: Basics of Compressible Flow Stagnation states, Mach waves and Mach cone
Week 3	Chapter Two: Isentropic Flow - Isentropic Flow through variable ducts - Quiz
Week 4	Chapter Two: Isentropic Flow Nozzle and Diffusers -The convergent and convergent–divergent nozzles and their applications. Use of Gas tables
Week 5	Chapter Two: Isentropic Flow Nozzle and Diffusers -The convergent and convergent–divergent nozzles and their applications. Use of Gas tables
Week 6	Chapter Two: Isentropic Flow - Nozzle and Diffusers -The convergent and convergent–divergent nozzles and their applications. Use of Gas tables - Quiz
Week 7	Chapter Three: Normal and Oblique Shocks Governing equations – Variation of flow parameters across the normal shocks
Week 8	Chapter Three: Normal and Oblique Shocks Governing equations – Variation of flow parameters across the oblique shocks
Week 9	Chapter Three: Normal and Oblique Shocks Prandtl – Meyer relations – Use of table and charts.



	Quiz
Week 10	Chapter Four: Flow Through Ducts Flows through constant area ducts with Friction (Fanno flow) - Use of tables and charts – Generalized gas dynamics
Week 11	Chapter Four: Flow Through Ducts Flows through constant area ducts with Heat transfer (Rayleigh flow) - Use of tables and charts – Generalized gas dynamics
Week 12	Chapter Four: Flow Through Ducts - Flows through constant area ducts with Friction (Fanno flow) and Heat transfer (Rayleigh flow) – Use of tables and charts – Generalized gas dynamics. - Quiz
Week 13	Chapter Five: Jet Propulsion Theory of jet propulsion – Thrust equation – Thrust power and propulsive efficiency – Operation principle, cycle analysis and use of stagnation state performance of turbojet, turbofan and turbo prop engines
Week 14	Chapter Five: Jet Propulsion - Theory of jet propulsion – Thrust equation – Thrust power and propulsive efficiency – Operation principle, cycle analysis and use of stagnation state performance of turbojet, turbofan and turbo prop engines. - Quiz
Week 15	Chapter Five: Jet Propulsion Rocket engine
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week	NA

Learning and Teaching Resources

مصادر التعلم والتدريس



	Text	Available in the Library?
Required Texts	1- Michel A. Saad, "Compressible Fluid Flow, Second Edition". 2- Genick Bar Meir, 2013, "Fundamental of Compressible Fluid Mechanics" 3- Asher H. Shapiro, 1953, "The Dynamic and Thermodynamic of compressible Fluid Flow", Volume I.	Yes
Recommended Texts	1- Michel A. Saad, "Compressible Fluid Flow, Second Edition".	Yes
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 المعالجة)	(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.				



Semester five	Manufacturing Process	ME316
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Manufacturing Processes		Module Delivery
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ME316		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Sameer F. Hamad	e-mail	Sfhamad4@uomisan.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	23/06/2023	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 and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. The course aims to introduce students to various advanced manufacturing and production processes. 2. Students acquire the skills required to work on production machines, metal welding and various plumbing operations. 3. Introducing students to different traditional machines and comparing them with programmed ones and how to prepare different operating programs. 4. Ability to communicate with scientific and engineering developments. 5. Knowing an idea about the mechanism of orthogonal cutting and how they can withstand it. 6. Understanding the powder metallurgy, knowing its types, manufacturing methods, limitations and advantages.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The student will be able to: 1. Provide a good understanding of the manufacturing processes for different materials. 2. Teach the theory of yield criteria 3. Calculate yield stress and force in bulk deformation processes types. 4. Learn basics of computer numerical controlled machining and part programming. 5. Learn Fundamentals includes Casting and form casting processes, mold castings, powder metallurgy.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Mechanical Properties of Materials, tensile test, Stress-Strain Curves, Ductility, True Stress and True Strain Curves, Instability in Tension, Types of Stress-Strain Curves, Temperature Effects, Triaxial Stresses, Yield Criteria, and Work of Deformation. 2. Bulk Deformation Types: Forging, Open Die Forging, Forging of a



Rectangular Workpiece in Plane Strain, Forging of a Solid Cylindrical Workpiece, Types of Forging, Various Forging Operations, Forging Equipment, Rolling Processes, Hot Rolling, Mechanics of Flat Rolling,, Various Roll Operations, Extrusion, Extrusion Types, Mechanics of Extrusion, Effect of Strain Rate, Extrusion Types, Die Design and Materials, Drawing, Mechanics of Rod and Wire Drawing, Derive Pressure Equation of Wire or Rod Drawing, Drawing of Tubes, Maximum Reduction per Pass, Swaging.

3. Expendable Mold, Permanent Pattern Casting - Sand Casting – Shell Molding - Investment Casting (lost wax casting) - permanent mold casting processes - die casting - centrifugal casting - semi-centrifugal casting – Single-Crystal Blades – Casting Defects - Shrinkage – Test for Fluidity.

4. Yield Point Elongation – Sheet metal Forming Processes Types – shearing Process – Punch Force – bending Process – Minimum Bend Radius – Springback – Bending Forces – Tube Bending – Beading –Stretch Forming – Hydroforming – Spinning – Tube Spinning – HERF - Explosive Forming – Electrohydraulic Forming Magnetic – Pulse Forming - Deep Drawing – Ironing – Defects in Deep Drawing

5. Powder Production – Atomization – Reduction – Electrolytic Deposition– Carbonyls Comminution – Mechanical Alloying – Blending Metal Powders – Compaction of Metal Powders – Density Distribution Pressure Distribution in Powder Compaction – Isostatic Pressing – Miscellaneous Compacting and Shaping Processes – Sintering – Sintering Mechanisms – Finishing Operations – Limitation of Powder Metallurgy – Applications of Powder Metallurgy.

6. Material Removal Processes Types – Mechanics of Chip Formation –Cutting Ratio – Velocities in the Cutting Zone - Types of Chips Produced in Metal Cutting – Mechanics of Oblique Cutting – Force in Orthogonal Cutting – Thrust Force and Its Direction – Shear and Normal Stresses in the Cutting Zone – Shear Angle Relationships – Specific Energy – Temperatures in Cutting – Variable Affecting Temperature – Techniques for Measuring Temperature.

7. Tool Wear and Failure – Flank Wear – Tool Life Curve – Crater Wear –Nose Wear – Chipping – Surface Finish of Machined Part – Inserts –Coated Tools – Turning Processes Types – Non-Traditional Machining.

8. Joining Processes Types – Oxyfuel Gas Welding – Arc Welding Processes – Plasma Arc Welding – High Energy Beam Welding – Solid State Welding Processes (USW, FRW, RW) – Adhesive Bonding –Mechanical Fastening – Hole Preparation - Threaded Fasteners – Rivets – Various Methods of Fastening.



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 types of simple experiments involving some sampling activities that are interesting to the students. Each student must present seminar about one of the subjects of manufacturing processes.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Quizzes	2	10% (25)	2-11	All



Formative assessment	Assignments	2	10% (10)	2-12	All
	Projects/lab.	5	10% (10)	4-13	All
	Report	1	10% (10)	12	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Iron and steel making: Iron ores Pig iron making, Blast furnace. Steel making: Process of steel making.
Week 2	Casting fundamentals: Casting processes characteristics, Casting techniques. Sand casting: Molding sand, Sand testing, Patterns, Molding machines, foundry furnaces, Cleaning and inspection of casting. Die casting methods: Pressure die casting methods.
Week 3	Other casting methods: Centrifugal casting , Lost-wax casting, Shell molding process, Continuous casting.
Week 4	Metal forming: Hot working of metal, Cold working of metal.
Week 5	Hammering /Forging: Types of forging processes, Hand forging tools, Automatic hammer forging, Die forging machines.
Week 6	Rolling: Types of Rolling machines, Calculation the angle of contact, Hot and cold Rolling processes.
Week 7	Extrusion: Methods of Extrusion, Tube Extrusion, Impact Extrusion.
Week 8	Drawing: Wire drawing machines, Tube drawing machines, Metal preparation for drawing.
Week 9	Sheet metal work: Processes of sheet metal forming, Joining of sheet metal, Soldering.



Week 10	Metal cutting: Chiseling steel metal, Filing steel metal, Sawing steel metal.
Week 11	Turning operations: Types of turning machines, Parts of turning machines, The lathe as a general purpose machine. Shaping operations: Classification of shapers.
Week 12	Milling operations: Types of milling machines. Drilling operations: Drills, Reamers, Drilling machines, Boring machines. Grinding operations: Types of grinding machines, Grinding tools.
Week 13	Welding: Electric Arc Welding, Metal Arc Welding, Tungsten and Metal Inert gas welding, Plasma welding. Fusion welding: Oxy acetylene welding, Thermit welding, Electron beam welding, Laser welding, Ultrasonic welding, Diffusion welding, Projection welding, Flash welding.
Week 14	Soldering and Brazing: Brazing and Soldering metals and alloys, The factors that the process depends on. Solid-state welding and other types of welding: Electric resistance welding, Friction welding, Explosion welding.
Week 15	-CNC machines: NC definition and comparison, Traditional tool machines and CNC machines comparison, Financial advantages and disadvantages of CNC, DNC- Direct numerical control CAD/CAM-Hierarchical NC. -Non Traditional machining: Ultrasonic machining, Chemical machining, Electro chemical machining, Electro spark machining, Electron beam machining, Laser machining, Electron grinding machining
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Manufacturing processes, second edition; H.N. Gupta, R.C. Gupta, Arun Mittal; Published by New Age International (P) Ltd.,	No



	Publishers. 2. Fundamentals of Modern Manufacturing, Materials, Processes, and Systems, Fourth edition; Mikell P. Groover; JOHN WILEY & SONS, INC. 3. Principles of metal manufacturing processes (1999); J. Beddoes, M. Bibby. 4. Manufacturing Engineering and Technology, Sixth edition; Serop Kalpakjian, Steven R. Schmid.	
Recommended Texts		
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 المعالجة)	(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.				



Semester six

Semester six	Numerical Analysis	ENG321
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Numerical Analysis		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENG321		
ECTS Credits	4		
SWL (hr/sem)	78		
Module Level	3	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammad Mahdie Saleh Al-Azawii	e-mail	Mohammed.alazawii@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1- To study numerical analysis methods and their applications in mechanical engineering. 2- To solve mechanical engineering problems with numerical analysis techniques. 3- To learn the basics of programming language and to write simple codes using MATLAB language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, student should be able to: 17- Apply numerical methods to solve linear algebraic equations and linear simultaneous equations. 18- Understand the basics of finite difference methods and interpolation. 19- Understand numerical differentiation and integration. 20- Apply curve fitting methods to represent experimental data. 21- Understand the numerical solution of ordinary differential equations. 22- Understand the numerical solution of partial differential equations. 23- Understand the basics concepts of finite elements method. 24- Solve mechanical engineering problems numerically using programming language (MATLAB language).
Indicative Contents المحتويات الإرشادية	12.Solution of Linear Algebraic Equations: Fixed-point method, and Newton-Raphson method 13.Solution of Linear Simultaneous Equations:



	Gauss-Seidel Method, Gauss Elimination method, and Gauss-Jordan method 14.Finite Differences and Interpolation: Forward differences, Backward differences, Center differences, Newton Interpolation method, and Lagrange Interpolation 15.Numerical Differentiation and Integration: Numerical Differentiation, Trapezoidal method, Simpson method, and Gauss Quadrature method 16.Curve Fitting: Linear and Polynomial Fitting, Exponential Fitting, Power Function Fitting 17.Numerical Solution of Ordinary Differential Equations: Euler First Order method, Modified Euler method, Runge-Kutta First Order method, Euler Second Order method, and Runge-Kutta Second Order method 18.Numerical Solution of Partial Equations: Solution of Laplace Equation in two-dimension, Solution of Wave equation, and Solution of Heat equation 19.Introduction to Finite Elements Method Weighted Residual, Galerkin Method, Shape Functions, Variational Approach, Steps of Finite Elements Method, Solution of 1-dim Stress Analysis Problems, and Solution of Heat Conduction Problems
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module of Numerical Analysis will adopt an interactive learning approach to actively engage students and enhance their critical thinking skills. The main strategy is to encourage student participation through classes, programming laboratory,



	and interactive tutorials. Students will have the opportunity to actively contribute to exercises and discussions, allowing for a deeper understanding of the subject matter. Overall, these learning and teaching strategies are designed to create an engaging learning environment that fosters active participation, critical thinking, and a comprehensive understanding of the concepts covered in the module.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	3, 5, 7, 9 and 11	All
	Assignments	2	10% (10)	6, 10	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	All



Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Solution of Linear Algebraic Equations Fixed-point iteration method, and Newton-Raphson method
Week 2	Chapter Two: Solution of Linear Simultaneous Equations Gauss-Seidel Method and Gauss Elimination method
Week 3	Chapter Two: Solution of Linear Simultaneous Equations - Gauss Elimination method (cont.) - Gauss-Jordan method - Quiz
Week 4	Chapter Three: Finite Differences and Interpolation Forward differences, Backward differences, and Center differences
Week 5	Chapter Three: Finite Differences and Interpolation - Newton Interpolation method, and Lagrange Interpolation - Quiz
Week 6	Chapter Four: Numerical Differentiation and Integration Numerical Differentiation, Trapezoidal method, Simpson method, and Gauss Quadrature method
Week 7	Chapter Five: Curve Fitting: - Linear and Polynomial Fitting - Quiz
Week 8	Chapter Five: Curve Fitting: Exponential Fitting and Power Function Fitting
Week 9	Chapter Six: Numerical Solution of Ordinary Differential Equations - Euler First Order method and Modified Euler method - Quiz



Week 10	Chapter Six: Numerical Solution of Ordinary Differential Equations Runge-Kutta First Order method, Euler Second Order method, and Runge-Kutta Second Order method
Week 11	Chapter Seven: Numerical Solution of Partial Equations - Solution of Laplace Equation in two-dimensions - Quiz.
Week 12	Chapter Seven: Numerical Solution of Partial Equations Solution of Wave equation
Week 13	Chapter Seven: Numerical Solution of Partial Equations Solution of Heat equation
Week 14	Chapter Eight: Introduction to Finite Elements Method Weighted Residual, Galerkin Method, Shape Functions, Variational Approach, and Steps of Finite Elements Method
Week 15	Chapter Eight: Introduction to Finite Elements Method Solution of 1-dim Stress Analysis Problems, and Solution of Heat Conduction Problems
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Programming language Code to find the Roots of non-linear equation.
Week 3-4	Programming language Code for matrices result from System of Linear algebraic Equations.
Week 5	Programming language Code for Interpolation.
Week 6-7	Programming language Code for numerical integration.
Week 8-9	Programming language Code for curve fitting.
Week 10-12	Programming language Code for Numerical solution of ordinary differential equations.



Week 13-15	Programming language Code for Numerical solution of partial differential equations by finite difference.
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Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	2. 1. “Numerical Methods for Engineers and Scientists”, An Introduction with Applications Using MATLAB. by Amos Gilat and Vish, Wiley 3 rd edition, 2014	Yes
Recommended Texts	1. Methods for Engineers and Scientists”, Joe Hoffman, McGraw-Hill Book Company, 1993. 2. “Applied Numerical Methods with MATLAB for Engineers and Scientists”, 2nd Edition, by S. Chapra. 3. “Applied Numerical Analysis”, Gerald, C.F. and Wheatley, P.O., 6th Edition, Pearson Education, 2006. 4. “Numerical Methods in Science And Engineering”, P. Dechaumpwchai, N. Wansophark, Oxford OX4 2JZ, U.K., 2020. 5. “Numerical Methods for Engineer”, 3 rd Edition by SANTOSH K GUPTA 6. “Numerical Methods for Engineers”, Steven C. Chapra, Raymond P. Canale, McGraw Hill, 6th edition, 2010.	Yes
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 المعالجة)	(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.



Semester six	Heat Transfer II	ME322
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Heat Transfer II		Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME322		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3		
Administering Department	Mech. Department	College	Engineering College
Module Leader	Ahmed Kadhim Alshara	e-mail	dr.ahmed_alshara@uomisan.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Murtadha Saeed Mohammed	e-mail	murtadha.saeed@uomisan.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Heat Transfer I	Semester	1
Co-requisites module		Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Be educated on heat transfer methods. 2. Know the laws of heat transfer and their calculations. 3. Develop your understanding of heat transfer system thermal load calculations. 4. Identify the relationships that were examined. 5. Studying the applications of heat transfer 6. Identify the most important design parameters for heat transfer applications and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Define the thermal and hydrodynamics boundary layers. 2. Identify the relations of boundary layers and range of Reynolds number. 3. Recognize the external forced convection. 4. Summarize the main relations of external flow and its ranges. 5. Define the mean temperature in the internal forced convection. 6. Discuss the developed and fully developed flow in the internal forced convection. 7. Describe the internal forced convection at constant heat flux and constant temperature. 8. Define the Rayleigh number in the natural convection. 9. Discuss the boundary layer in the natural convection. 10. Explain the arrangements of natural convection. 11. Identify the type of heat exchangers. 12. Define the log mean temperature difference 13. Recognize the effectiveness-NTU method.
Indicative Contents	The main indicative contents are:



المحتويات الإرشادية	Velocity boundary layer and thermal boundary layer (6hr), Non-dimensional groups numbers analysis (3hr), Steady state forced convection and friction factors (3hr), Empirical relation of external flow (3hr), Flow across cylinder and sphere and flow across banks of tubes (3hr), Average temperature and laminar and turbulent flow in tubes (3hr), Hydrodynamics and thermal entrance region (3hr), Empirical relation for pipe and tube flow (3hr), Free convection from vertical plate and Free convection from inclined plate (3hr), Free convection from horizontal plate (3hr), Free convection from horizontal cylinder and sphere (3hr), Types of heat exchangers and fouling factor (3hr), Analysis of heat exchangers and counter heat exchanger (3hr), The log mean temperature difference and the effectiveness-NTU method (3hr).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies that will be adopted in delivering this unit are: 1- Encourage students to participate in the exercises. This is achieved through classes and interactive educational programmers. 2- Improving and expanding critical thinking skills at the same time and by thinking about the type of simple experiments that include some sampling activities of interest to the students. 3-Raise students scientific and knowledge levels by employing the automatic technique, conversational approach, and active method.



Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO # 1, 2, 8,9 and 10
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6, 7 and 13
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 11 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction to Convection Velocity boundary layer
Week 2	Chapter One: Introduction to Convection Thermal boundary layer
Week 3	Chapter One: Introduction to Convection Non-dimensional groups numbers analysis
Week 4	Chapter Two: Introduction to External Flow - Steady state forced convection - Friction factors
Week 5	Chapter Two: Introduction to External Flow - Empirical relation of external flow - quiz
Week 6	Chapter Two: Introduction to External Flow - Flow across cylinder and sphere - Flow across banks of tubes
Week 7	Chapter Three: Introduction to Internal Flow - Average temperature - Laminar and turbulent flow in tubes
Week 8	Chapter Three: Introduction to Internal Flow Hydrodynamics and thermal entrance region
Week 9	Chapter Three: Introduction to Internal Flow Empirical relation for pipe and tube flow
Week 10	Chapter Four: Introduction to Natural Convection - Free convection from vertical plate - Free convection from inclined plate. - Quiz.
Week 11	Chapter Four: Introduction to Natural Convection Free convection from horizontal plate
Week 12	Chapter Four: Introduction to Natural Convection Free convection from horizontal cylinder and sphere
Week 13	Chapter Five: Introduction to Heat Exchangers - Types of heat exchangers - Fouling factor.



	Report Due.
Week 14	Chapter Five: Introduction to Heat Exchangers - Analysis of heat exchangers - Counter heat exchanger
Week 15	Chapter Five: Introduction to Heat Exchangers - The log mean temperature difference - The effectiveness-NTU method
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Radial and linear heat transfer by conduction in solid
Week 2	Lab 2: Radial and linear heat transfer by conduction in solid
Week 3	Lab 3: Effectiveness of Extended Surface (Pin Fin)
Week 4	Lab 4: Effectiveness of Extended Surface (Pin Fin)
Week 5	Lab 5: Radiation Heat Transfer Experiment
Week 6	Lab 6: Radiation Heat Transfer Experiment
Week 7	Lab 7: Natural and Forced Convection Heat Transfer
Week 8	Lab 8: Natural and Forced Convection Heat Transfer
Week 9	Lab 9: Performance of shell and tube heat exchanger
Week 10	Lab 10: Performance of shell and tube heat exchanger
Week 11	Lab 11: Cross Flow Heat Exchanger
Week 12	Lab 12: Cross Flow Heat Exchanger
Week 13	Lab 13: Review



Week 14	Lab 14:Examination
Week 15	Lab 15:Final examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Text of lectures 2-Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Seventh Edition, 2011.	Yes
Recommended Texts	1.Heat Transfer J. p . Holman, Tenth Edition, 2010. 2.Heat and Mass Transfer Fundamentals & Applications Yunus A. Çengel & Afshin J. Ghajar, fifth Edition, 2015.	yes
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	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded



(0 – 49)	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.



Semester six	Theory of Machines	ME323
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Theory of Mechanism		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME323		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	3	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Jasim Hasan Ilik	e-mail	j.h.al-bedhany@uomisan.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor	Ali Husien Hasan	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics - Dynamic	Semester	1
Co-requisites module	None	Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The student will be able to analyze: 1. The linear and angular velocities and accelerations. 2. The CAM and follower movements and design. 3. The gear terminology and stresses due to contact. 4. The role and design of flywheels.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main outcome is graduate a mechanical engineer can introduce analyses of different mechanisms and their velocities and accelerations forces and stresses on them.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Encourage the students to analyze the movements of machine components, the role of them and the types of forces acting on them. The mentioned will be achieved through lectures, tutorials, tests and project in addition to Laboratories.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 12	All
	Assignments	1	10% (10)	13	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction to Velocity and Acceleration Diagrams. • Introduction to movements (linear and angular.
Week 2	Chapter One: Introduction to Velocity and Acceleration Diagrams. • Velocity of points on a rolling body.
Week 3	Chapter Two: Introduction to Velocity and Acceleration Diagrams. • Introduction to Linear and angular accelerations.
Week 4	Chapter Two: Introduction to Velocity and Acceleration Diagrams. • Equivalent linkage and Corioles component. .
Week 5	Chapter Three: Introduction to Cams and followers. • Introduction. • Cams and followers types. • Quiz.
Week 6	Chapter Three: Cams and Followers. • Displacement diagrams. • Types of Motions. • Construction of Cam Profile.
Week 7	Chapter Three: Cams and Followers. • Construction of Cam Profile.
Week 8	Chapter Four: Introduction to Gears • Introduction and gear terminology. • Gear requirements and classifications of gears.
Week 9	Chapter Four: Introduction to Gears • Terms and definitions and analyses procedure. • Contact Ratio and Number of teeth.
Week 10	Chapter Four: Introduction to Gears • Gear Trains.



Week 11	Chapter Five: Flywheels • Introduction. • Flywheel mass.
Week 12	Chapter Five: Flywheels • Flywheels for Internal Combustion Engines. • Quiz.
Week 13	Chapter Five: Flywheels • TMD and relevant coefficients.
Week 14	Reviewing
Week 15	Chapter Six: Introduction Design of Machines • Introduction to Design problems.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Velocity of Crank Slider Mechanism.
Week 2	Lab 2: Velocity of Four and Five Members Mechanisms.
Week 3	Lab 3: Acceleration of Crank Slider Mechanism.
Week 4	Lab 4: Acceleration of Four and Five Members Mechanisms.
Week 5	Lab 5: Cams with Simple Harmonic Motion (SHM).
Week 6	Lab 6: Cams with Uniform acceleration and Retardation (UAR).
Week 7	Lab 7: Cam profiles of SHM and UAR.
Week 8	Lab 8: Cam profiles of UAR.
Week 9	Lab 9: Gears and Pinions



Week 10	Lab 10: Classification of Gears.
Week 11	Lab 11: Gear Trains.
Week 12	Lab 12: Flywheels and Mass Moment of Inertia.
Week 13	Lab 13:Review
Week 14	Lab 14:Examination
Week 15	Lab 15:Final examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Theory of Machines by R. S. Khurmi.	Yes
Recommended Texts	3. The theory of Machines by Robert W. Angus First Edition Part I. 4. Theory of Machines and Mechanisms by John J. Dicker, Jordon R. Penock and Joseph E. Shigley	yes
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 المعالجة)	(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.



Semester six	Internal Combustion Engines II	ME324
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Internal Combustion Engines II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ME324		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	3	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Sara Jumah Flayh	e-mail	sarajumah@uomisan.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Assist. Lec.
Module Tutor	Sara Jumah Flayh	e-mail	sarajumah@uomisan.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	02/07/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ME314	Semester	1
Co-requisites module		Semester	



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The module aims are: 1. Teaching of engines fuels. 2. Teaching of combustion chamber phenomena (knocking, combustion, flame propagation, different flow motions). 3. Develop your understanding of Carbureting proses and Ignition system. 4. Identify the important of General combustion theory. 5. Description of different engines systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The main module learning outcomes are: 1. Understanding difference among engines fuels. 2. Knowing the engines undesired phenomena such as knocking and how can avoid them. 3. Study combustion phenomenon and flame propagation. 4. Study fluids motions inside engines. 5. Gain knowledge about Engine Design.
Indicative Contents المحتويات الإرشادية	The main indicative contents are: Heating value of fuels, Ratings of SI Engine Fuels (3hr), Important Qualities of SI Engine Fuels. (3hr), Qualities and Ratings CI Engine fuels, Combustion Calculations (3hr), Main metering system, The simple carburetor (3hr), Mixture control, carburetor types. The injection carburetor. (3hr), Ignition system (3hr), General combustion theory. Normal combustion and flame front propagation (3hr), Abnormal combustion. Engine operation variables affecting detonation. Combustion chamber design. (3hr),



	General information pertaining to the C.I. Engine characteristics of the CI Engine. (3hr), Fuel supply and injection systems (3hr), Combustion in the CI Engine. Ignition delay. (3hr), General functions and characteristics of the combustion chamber. Comparison of some basic design of CI Engine combustion chamber. (3hr), cooling systems (3hr). Mechanism of lubrication. Types of bearings used in IC Engines (3hr). Engine Design (3hr).
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Students know complete description about different systems that are associated with engines such as intake system, exhaust system, engine cooling system, and lubrication system. Students learn general aspects of engines fuels including comparison among them. Phenomena that take place within engines (knocking, combustion, flame propagation, different fluids motions) are taught to students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.2
Unstructured SWL (h/sem)	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.8



الحمل الدراسي غير المنتظم للطلاب خلال الفصل		
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75	

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (10)	6, 13	LO #1, 2, 3 and 4, 5
	Assignments	2	15% (10)	7, 14	LO #1, 2, 3 and 4, 5
	Projects / Lab.				
	Report	1	10% (10)	13	
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 الاسبوعي النظري	
	Material Covered
Week 1	Chapter One: Fuels of I.C. engines and Combustion Calculations - Heating value of fuels. - Ratings of SI Engine Fuels



Week 2	Chapter One: Fuels of I.C. engines and Combustion Calculations Important Qualities of SI Engine Fuels.
Week 3	Chapter One: Fuels of I.C. engines and Combustion Calculations - Qualities and Ratings CI Engine fuels. - Combustion Calculations.
Week 4	Chapter Two: Carbureting and Carburetors - Main metering system. - The simple carburetor. - Variables metering carburetor performance.
Week 5	Chapter Two: Carbureting and Carburetors - Mixture control, carburetor types. - The injection carburetor.
Week 6	Chapter Three: Spark Ignition - Ignition system requirements. - Battery ignition system. - Magneto ignition system. - Spark plugs. - Ignition timing. - quiz
Week 7	Chapter Four: Combustion in S.I. Engines - General combustion theory. - Normal combustion and flame front propagation.
Week 8	Chapter Four: Combustion in S.I. Engines - Factors affecting flame speed. - Rate of pressure rise. - Abnormal combustion. - Engine operation variables affecting detonation. - Combustion chamber design.
Week 9	Chapter Five: The Compression Ignition Engine and Fuel Injection General information pertaining to the C.I. Engine characteristics of the CI Engine.
Week 10	Chapter Five: The Compression Ignition Engine and Fuel Injection - Types of CI Engines. - Fuel supply and injection systems. - Typical solid injection systems. - The injector nozzle.
Week 11	Chapter Six: Combustion in the CI Engine - Combustion in the CI Engine. - Ignition delay.
Week 12	Chapter Six: Combustion in the CI Engine - Combustion knock in the CI Engine. - Variables affecting ignition delay. - General functions and characteristics of the combustion chamber.



	• Comparison of some basic design of CI Engine combustion chamber.
Week 13	Chapter Seven: Cooling of IC Engine • Liquid cooling systems. • Air cooling system. • Engine cooling problems. • Quiz.
Week 14	Chapter Eight: Lubrication of IC Engines • Mechanism of lubrication. • Types of bearings used in IC Engines. • Properties of lubricating oils. • Additives. • Lubricating systems.
Week 15	Chapter Nine: Engine Design • Preliminary Analysis, cylinder number, size and arrangement. • Detailed design procedure.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-Text of lectures 2- Engineering Fundamentals of the Internal Combustion Engine. Willard W. Pulkrabek. University of Wisconsin.	Yes
Recommended Texts	1. Internal Combustion Engine Fundamentals. John B. Heywood. McGraw-Hill, Inc., New York.	no
Websites	internal combustion engines videos - Bing video	



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 المعالجة)	(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.



Semester six	Turbo Machinery	ME325
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Turbo Machinery		Module Delivery
Module Type	Core	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME325		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3		
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammad Mahdie Saleh Al-Azawii	e-mail	Mohammed.alazawii@uomisan.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0

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



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	7. Discriminating turbomachines according to different criteria; work done on or by and the direction of flow. 8. Deriving the main equations govern turbomachines from its first principles. 9. Deriving different types of efficiencies and power for different types of turbomachines. 10. Using similarity and similitude methods to design any prototype turbomachine using the basic information from any module turbomachine under similar design conditions. 11. Analyzing flow over surfaces of blade of any turbomachine. 12. Using the data extracted from the above point to calculate the performance characteristics of any turbomachines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, student should be able to: 1- draw and analyze the velocity diagrams for any turbomachines, such as pumps, turbines and compressors. 2- determine the power and efficiency of any turbomachines. 3- choose/recommend the needed turbomachines device using charts. 4- differentiate between different types of turbomachines based on the inlet flow, such as axial flow, radial flow and mixed flow devices. 5- find the different types of losses that impact the performance of any turbomachines during the operation.
Indicative Contents المحتويات الإرشادية	20. Introduction to Turbomachinery: Application of 1st and 2nd laws of thermodynamics to turbo machines. 21. Pumps and Fans: Classification of rotodynamic pumps, components of centrifugal pump, types of heads, velocity triangles and their analysis, effect of outlet blade angle, cavitation, NPSH, specific speed, performance characteristics of



	centrifugal pump, series and parallel operation of pumps, system resistance curve, selection of pumps 22. Water Turbines: Impulse turbine- Pelton Type, Reaction turbine- Francis and Kaplan, Similarity law of water turbines, unit and specific quantities. . 23. Compressor: Axial and Centrifugal compressors, construction, stage velocity triangles and its analysis, flow through the blade rows, performance characteristics. 24. Gas Turbine: Classifications (Axial and Radial), construction details, velocity diagrams and analysis of (single & multistage) turbines, governing, performance characteristics.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module of Turbo Machinery will adopt an interactive learning approach to actively engage students and enhance their critical thinking skills. The main strategy is to encourage student participation through classes, and interactive tutorials. Students will have the opportunity to actively contribute to exercises and discussions, allowing for a deeper understanding of the subject matter. Overall, these learning and teaching strategies are designed to create an engaging learning environment that fosters active participation, critical thinking,



	and a comprehensive understanding of the concepts covered in the module.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	3, 6, 9, 12 and 14	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Chapter One: Introduction to Turbomachinery • Application of 1st and 2nd laws of thermodynamics to turbo machines.
Week 2	Chapter Two: Pumps and Fans • Classification of rotodynamic pumps, components of centrifugal pump, types of heads, velocity triangles and their analysis, effect of outlet blade angle
Week 3	Chapter Two: Pumps and Fans • Classification of rotodynamic pumps, components of centrifugal pump, types of heads, velocity triangles and their analysis, effect of outlet blade angle
Week 4	Chapter Two: Pumps and Fans • Cavitation, NPSH, specific speed
Week 5	Chapter Two: Pumps and Fans • Cavitation, NPSH, specific speed • Quiz
Week 6	Chapter Two: Pumps and Fans • Performance characteristics of centrifugal pump, series and parallel operation of pumps, system resistance curve, selection of pumps
Week 7	Chapter Three: Water Turbines • Impulse turbine- Pelton Type
Week 8	Chapter Three: Water Turbines • Impulse turbine- Pelton Type • Quiz
Week 9	Chapter Three: Water Turbines • Reaction turbine- Francis and Kaplan
Week 10	Chapter Three: Water Turbines • Reaction turbine- Francis and Kaplan
Week 11	Chapter Three: Water Turbines • Similarity law of water turbines, unit and specific quantities. • Quiz
Week 12	Chapter Four: Compressor



	• Axial and Centrifugal compressors, construction, stage velocity triangles and its analysis, flow through the blade rows, performance characteristics.
Week 13	Chapter Four: Compressor • Axial and Centrifugal compressors, construction, stage velocity triangles and its analysis, flow through the blade rows, performance characteristics. • Quiz
Week 14	Chapter Five: Gas Turbine • Classifications (Axial and Radial), construction details, velocity diagrams and analysis of (single & multistage) turbines, governing, performance characteristics
Week 15	Chapter Five: Gas Turbine • Classifications (Axial and Radial), construction details, velocity diagrams and analysis of (single & multistage) turbines, governing, performance characteristics. • Quiz
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Properties of Centrifugal Impellers
Week 3-5	Parallel of Centrifugal Pumps
Week 6-8	Series of Centrifugal Pumps
Week 9-11	Pelton Turbine
Week 12-14	Francis Turbine

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?



Required Texts	4- Turbomachinery Design and Theory, (2003), Rama S. R. Gorla, and Aijaz A. Khan. 5- Principles of Turbomachinery, (1995), R.K. Turton, Second Edition. 6- Fluid Mechanics, Thermodynamics of Turbomachinery, (1998) S.L Dixon, B. Eng., PH.D. Fourth Edition.	Yes
Recommended Texts	1- Turbomachinery Design and Theory, (2003), Rama S. R. Gorla, and Aijaz A. Khan	Yes
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 المعالجة)	(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.				



Semester six	Electrical Machines	ME326
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Machines		Module Delivery
Module Type	S	☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ME326		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	2
Administering Department	Mech. Department	College	Engineering College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0



Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To introduce students to the fundamental principles of electromagnetism and their application to electrical machines. 2. To develop students' ability to analyze and evaluate the performance characteristics of DC and AC machines. 3. To provide students with the knowledge and skills necessary to design electrical machines for specific applications, considering factors such as efficiency, power output, and size. 4. To familiarize students with the control systems and power electronics used in electrical machines. 5. To provide hands-on experience through laboratory experiments and simulations, enabling students to apply theoretical concepts to practical scenarios. 6. To develop students' problem-solving skills in identifying and resolving issues related to electrical machines and their integration into mechanical systems. 7. To foster an understanding of the importance of efficiency, sustainability, and optimization in the design and operation of electrical machines.
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	8. To enhance students' ability to work collaboratively in teams and effectively communicate their ideas and findings related to electrical machines. 9. To explore the various applications of electrical machines in mechanical engineering systems, highlighting their significance in modern industrial practices. 10. To promote lifelong learning and encourage students to stay updated with advancements and emerging technologies in the field of electrical machines.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental principles of electromagnetism and their application to electrical machines. 2. Analyze and evaluate the performance characteristics of DC and AC machines. 3. Design electrical machines for specific applications considering factors such as efficiency, power output, and size. 4. Demonstrate knowledge of the control systems and power electronics used in electrical machines. 5. Apply theoretical concepts to practical scenarios through laboratory experiments and simulations. 6. Identify and solve problems related to electrical machines and their integration into mechanical systems.
المحتويات الإرشادية	



Indicative Contents	1. Introduction to electromagnetism and magnetic circuits. 2. Principles and operation of DC machines: generators and motors. 3. Principles and operation of AC machines: synchronous and induction machines. 4. Transformer theory and applications.
	5. Motor drives and power electronics. 6. Performance characteristics and efficiency analysis of electrical machines. 7. Control systems and regulation techniques for electrical machines. 8. Laboratory experiments and simulations to reinforce theoretical concepts. 9. Applications of electrical machines in mechanical engineering systems.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

1. Lectures: In-class lectures delivered by the instructor to introduce and explain key concepts, theories, and principles related to electrical machines.
2. Practical Sessions: Hands-on practical sessions in laboratories where students can perform experiments, measurements, and simulations to reinforce theoretical knowledge and develop practical skills.
3. Tutorials: Small group or one-on-one tutorial sessions to provide additional support and guidance to students, address their queries, and clarify complex topics.
4. Problem-Solving Sessions: Dedicated sessions where students are given problem-solving exercises related to electrical machines, encouraging them to apply their knowledge and analytical skills to find solutions.
5. Case Studies: Analysis of real-world case studies involving electrical machines, helping students understand the practical applications and challenges faced in different industries.
6. Group Projects: Collaborative projects that require students to design, analyze,



	and present solutions related to electrical machines. This promotes teamwork, critical thinking, and problem-solving skills. 7. Computer Simulations: Utilizing computer software or virtual tools to simulate the behavior and performance of electrical machines, enabling students to explore different scenarios and understand their impact. 8. Independent Study: Encouraging students to engage in self-directed study, research, and exploration of additional resources to deepen their understanding of specific topics and stay updated with advancements in the field. 9. Assessment Methods: Employing various assessment methods, such as exams, quizzes, laboratory reports, project presentations, and written assignments, to evaluate students' understanding and application of the concepts taught.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		



Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 9	All
	Assignments	2	10% (10)	2, 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO #5, #8 and #10
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Generators
Week 2	Types of D.C generators and applications
Week 3	Motors
Week 4	Types of D.C motors and applications
Week 5	Torques speed characteristics and equations
Week 6	Starting of D.C motors
Week 7 Tr	Transformers
Week 8	Polyphase circuits



Week 9	A.C machines
Week 10	Types of A.C machine
Week 11	3-phase synchronous
Week 12	Induction motors
Week 13	Single phase A.C motors
Week 14	Converters
Week 15	Transmission and distribution of electrical energy
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1 & 2	Lab 1: Measurement of DC Motor Characteristics
Week 3 & 4	Lab 2: Performance Analysis of an Induction Motor
Week 5 & 6	Lab 3: Transformer Testing and Efficiency Calculation
Week 7 & 8	Lab 4: Analysis of a Single-Phase Induction Motor
Week 9 & 10	Lab 5: Speed Control of a DC Motor
Week 11 & 12	Lab 6: Study of Three-Phase Synchronous Generator



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theraja, B. L. A textbook of electrical technology. S. Chand Publishing, 2008.	no
Recommended Texts	Gerling, Dieter. Electrical Machines. Springer-Verlag Berlin	no
	An, 2016.	
Websites	https://www.youtube.com/watch?v=LpCQYXjPdIQ&list=PLp6ek2hDcoNCANsWM2mw3qi0387BhfLyV	



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 المعالجة)	(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.



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computational Fluid Dynamics (CFD)		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ME327		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Mech. Department	College	Engineering College
Module Leader	Mohammad Mahdie Saleh Al-Azawii	e-mail	Mohammed.alazawii@uomisan.edu.iq
Module Leader's Acad. Title	Asst. Prof	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/07/2026	Version Number	1.0

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



Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	Computational fluid dynamics (CFD) is the use of computers and numerical methods to solve problems involving fluid flow. Therefore, the aims of the CFD module are: 13. Define Fluid dynamics which represents the basis for CFD class. 14. Discriminating CFD according to definition and applications. 15. Deriving the main equations govern fluid dynamics from its first principles. 16. Explain the three approaches to fluid dynamics: Theoretical approach, experimental approach and computational approach 17. Introduce the discretization methods: Finite Difference Methods, Finite Volume Methods, and Finite Elements Method 18. Use computers to solve CFD problems using Commercial Software's.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, student should be able to: 6- Understand the physical meaning for a CFD problems and how to solve them numerically. 7- Transform the differential equations using discretization methods to algebraic equations in order to make them solvable. 8- Build a model and define all the related conditions such as: geometry, physics, equations, boundary conditions, meshes, run the model, and analyze the results using computers.
Indicative Contents المحتويات الإرشادية	



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	CFD is designed to provide students with a strong foundational and practical understanding of Fluid flow, required governing equations, partial differential equations, and the main discretization methods. Therefore, the module of CFD will adopt an interactive learning approach to actively engage students and enhance their critical thinking skills. The main strategy is to encourage student participation through classes, and interactive tutorials. Students will have the opportunity to actively contribute to exercises and discussions, allowing for a deeper understanding of the subject matter. Overall, these learning and teaching strategies are designed to create an engaging learning environment that fosters active participation, critical thinking, and a comprehensive understanding of the concepts covered in the module.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	3, 6, 9, 12 and 14	All
	Assignments	2	10% (10)	5, 10	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	15	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to CFD What is computational fluid dynamics? Basic principles of CFD, and Stages in a CFD simulation.
Week 2	Introduction to CFD Fluid-flow equations and the main discretization methods
Week 3	Introduction and Conservative equations
Week 4	Fluid-Flow Equations Non-conservative equations and non- dimensionalization
Week 5	Approximations and Simplified Equations - Steady-state vs time-dependent flow and Two-dimensional vs three-dimensional flow. - Quiz



Week 6	Approximations and Simplified Equations • Incompressible vs compressible flow, Inviscid vs viscous flow, and Hydrostatic vs non-hydrostatic flow.
Week 7	Approximations and Simplified Equations • Boussinesq approximation for density, Depth-averaged (shallow-water) equations, and Reynolds-averaged equations (turbulent flow)
Week 8	The Scalar-Transport Equation • Control-volume notation • The steady-state 1-D advection-diffusion equation • Discretizing diffusion • Quiz
Week 9	The Scalar-Transport Equation • Discretizing the source term • The matrix equation • Discretizing advection (part 1) •
Week 10	The Scalar-Transport Equation • Extension to 2 and 3 dimensions • General discretization properties • Discretizing advection (part 2) •
Week 11	The Scalar-Transport Equation • Implementation of advanced advection schemes • Boundary conditions • Summary • Quiz
Week 12	Pressure and Velocity • The momentum equation • Pressure-velocity coupling •
Week 13	Pressure and Velocity • Pressure-correction methods • Summary • Quiz
Week 14	Time-Dependent Methods • The time-dependent scalar-transport equation • One-step methods for single variables • One-step methods for CFD •



Week 15	Time-Dependent Methods - Multi-step methods - Uses of time-marching in CFD - Quiz
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Introduction to CFD
Week 3-4	Fluid-Flow Equations
Week 5-7	Approximations and Simplified Equations
Week 8-11	The Scalar-Transport Equation
Week 12-13	Pressure and Velocity
Week 14-15	Time-Dependent Methods

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	7- An introduction to Computational Fluid Dynamics: The Finite Volume Method by Versteeg and Malalasekera, Longman Scientific & Technical.	Yes
Recommended Texts	2- Computational Fluid Dynamics: The basic with applications Turbomachinery Design and Theory, (1995), John D. Anderson, Jr.	Yes



Websites	
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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 المعالجة)	(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.				