MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
SCIENTIFIC SUPERVISION AND SCIENTIFIC EVALUATION APPARATUS
DIRECTORATE OF QUALITY ASSURANCE AND ACADEMIC ACCREDITATION
ACCREDITATION DEPARTMENT

ACADEMIC PROGRAM AND COURSE DESCRIPTION GUIDE OF MECHANICAL ENGINEERING DEPARTMENT

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

Academic Program and Course Description Guide

2025

Introduction:

The educational program is a well—planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, semester based) , as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard we can only emphisize the importance of writing academic programs and course description to ensure proper functioning of the educationing process.

Concepts and terminology:

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

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

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

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

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

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: **A** compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra—curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Mosul

Faculty/Institute: College of Engineering

Scientific Department: Mechanical Engineering Department

Academic or Professional Program Name: Bachelor / Mechanical Engineering

Final Certificate Name: Bachelor of Science in Mechanical Engineering

Academic System: Bologna process – semester – courses

Description Preparation Date: / /

File Completion Date: / /

Signature:
Head of Department Name:
Asst. Prof. Dr. Abdulhaqq A. Hamid
Date: / /2025

Signature:
Scientific Associate Name:
Asst. Prof. Dr. Ayman T. Hamid
Date: / / 2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Asst. Prof. Dr. Abdulrahman Hani Taha

Date: / / 2025

Signature:

Approval of the Dean

Asst. Prof. Dr. Omar M. Hamdoon

1. Program Vision

The department is looking to be one of the leading departments in the field of mechanical engineering at the level of Iraq and the region through graduating engineers specializing in mechanical engineering following the latest approved scientific curricula and using the latest scientific teaching methods, such as modern laboratories and teaching methods.

2. Program Mission

1. Graduating qualified engineers with various mechanical engineering disciplines, which include the fundamentals of mechanical design, thermal capacity, different production methods, air conditioning, and refrigeration, to have the ability to be creative and innovative in various engineering fields and keep pace with scientific development.
2. Providing practical opportunities for students to learn about the principles and scientific facts of engineering along with the theoretical aspect by establishing modern laboratories and engineering workshops equipped with the latest types of equipment and laboratory supplies and organizing scientific trips to various institutions of the country.
3. Providing the best possibilities for building the leadership qualities of graduate students by teaching them outstanding teamwork, mobilizing student efforts to participate and contribute to student community service, and urging students to be creative and innovative to achieve the community's need for qualified mechanical engineers.
4. Holding seminars, scientific conferences, and training courses for the employees of all departments and the different industrial sectors to inform them of the most prominent scientific and technological developments to

enhance the efficiency and capacity of engineering staff in all sectors of the country.

3. Program Objectives

1. Preparing qualified scientifically and socially integrated engineers, developing their passion for work and scientific research, and the ability to think creatively and collaborative teamwork, in addition to practicing modern technologies and industrial applications.
2. Prepare engineers to develop and participate in scientific research and studies in the field of department specializations, especially in finding solutions to various issues facing economic and social development.
3. Communicating with the community and its institutions, providing engineering services, and being open to the community, encouraging the public and private sectors to consolidate a good relationship with the university through offering consultations and holding specialized training courses in various fields of mechanical engineering according to the requirements of the community.
4. Communicate with reputable international universities, exchange experiences and modern scientific information to develop theoretical and practical aspects, and urge researchers to apply for international funding and grant projects.
5. Supporting the Scientific Research Ethics Committee.
6. Urging researchers to apply for international grants and funding projects.

4. Program Accreditation

Not yet

5. Other external influences

Doesn't have

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
University Requirements	8	17	9.7 %	Basic course
	4	8	4.6 %	Elective course
College Requirements	11	23	13.1 %	Basic course
	0	0	0 %	Elective course
Department Requirements	35	83	47.4 %	Basic course
	20	44	25.1 %	Elective course
Summer Training	Exist			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			Theoretical	practical
2024 -2025 / First level / Bologna Process	ME101	Engineering Mechanics-Statics I	3	
	ME102	Mathematics I	3	
	ME103	Manufacturing Processes I	3	3
	ME104	Engineering Drawing		3
	ME105	Physics for Engineers	3	
	UOM103	The Computer	2	1
	UOM101	Arabic Language	2	
	ME151	Engineering Mechanics-Statics II	3	
	ME152	Mathematics II	3	
	ME153	Physics of Metallurgy	3	
	ME154	Introduction to Electrical Engineering	3	2
	ME155	Energy and Sustainability	3	

	UOM102	English language I	2	
	UOM104	Democracy and Human Rights	2	
2024 –2025 / Second stage / Bologna Process	ME201	Engineering Mechanics-Dynamics	3	
	ME202	Fluid Mechanics I	2	
	ME203	Thermodynamics I	2	
	ME204	Mechanics of Materials I	2	
	ME205	Metallurgy	2	2
	ME206	Mechanical Drawing		3
	UOM2050	Crimes of the Baath regime in Iraq	2	
	UOM2022	English Language 2	2	
	ME251	Fluid Mechanics II	2	
	ME252	Thermodynamics II	3	
	ME253	Mechanics of Materials II	2	
	ME254	Engineering Mathematics	4	
	ME256	Mechanical Engineering Laboratory I		3
	UOM2032	Computer 2	2	
	UOM2012	Arabic Language 2	2	
2024 –2025 / Third stage / Courses		English Language - intermediate	2	
	ENGC325	Engineering Management	2	
	MEC301	Engineering Analysis	3	
	MEC302	Conduction Heat Transfer	3	
	MEC303	Kinematic Analysis	2	
	MEC304	Electric Machines	2	
	MEC305	Mechanical Workshop		2
	MEC331	Compressible Fluid Flow	3	
	MEC332	Metallurgy	2	2
	UOMC104	Professional ethics	2	
	ENGE329	Public Safety	2	
	ENGE320	Numerical Analysis	2	

	MEC352	Convection and Heat Transfer Radiation	2	
	MEC353	Introduction to Machine Design	3	
	MEC354	Machines Dynamics	2	
	MEC355	Laboratory II		3
	MEC360	Turbomachinery	2	
	MEC361	Metallic Engineering Materials	2	
	MEC362	Introduction to Combustion	2	
	MEC363	Medium Manufacturing Processes	1	3
	MEC364	Solar Energy	2	
	MEC465	Introduction to Composite Materials	2	
2024 –2025 / Fourth stage / Courses	MEC401	Introduction to Vibrations	2	
	MEC402	Internal Combustion Engines	3	
	MEC403	Intermediate Machine Design	3	
	MEC404	Engineering Project I	2	
	MEC453	Air-conditioning	3	
	MEC421	Power Plant	3	
	MEC422	Renewable Energy II	2	
	MEC426	Flexibility	2	
	MEC425	Non-Metallic Engineering Materials	2	
		English Language - Upper mediate	3	
	MEC405	Control and Measurements		3
	MEC452	Laboratory III	3	
	MEC467	Intermediate Vibration	2	
	MEC454	Engineering Project II	2	
	MEC461	Pollution	3	
	MEC462	Refrigeration	3	
	MEC463	Computer Aided Thermal System Design	1	2

	MEC451	Design and Analysis of Control System	3	
	MEC466	Computer Aided Mechanical Design	1	2
	MEC465	Plasticity	2	

8. Expected learning outcomes of the program

Knowledge	
A1- The ability to distinguish, identify, define, formulate, and solve engineering problems by applying the principles of engineering, science, and mathematics.	**A3**- The ability to communicate skillfully orally with a group of people and in writing with various administrative levels.
A2- The ability to produce engineering designs that meet the required needs within certain constraints and apply analysis and synthesis in the design process.	**A4**- Interpreting numerical data and applying mathematical methods to analyze problems.
Skills	
B1- Ability to establish and perform appropriate measurements and tests while ensuring quality, analyze and interpret results, and use engineering judgment to reach conclusions.	**B3**- Ability to work appropriately within teams, set goals, plan activities, meet deadlines, and manage risks.
B2- The ability to use standard tools and techniques to conduct and design practical experiments for mechanical and electromechanical systems and to analyze and interpret data correctly.	**B4**- The possibility of effectively using information technology and modern engineering applications to start scientific research projects in the future.
Ethics	
C1- Ability to recognize ethical and professional responsibilities in engineering issues and make informed judgments while considering the consequences worldwide in	**C3**- The ability to recognize the ongoing necessity of professional knowledge growth and how to find, evaluate, accumulate, and apply it correctly.

financial, environmental, and societal considerations.	
C2- Commitment to the foundations of professionalism, respect for privacy principles, and maintaining confidentiality related to communication skills and writing reports while being familiar with economic, legal, health, social, and security determinants.	**C4**- Applying modern engineering techniques, skills, tools, and intelligent control of mechanical systems.

9. **Teaching and Learning Strategies**	
Theoretical lectures.	Computer laboratories.
Discussion sessions.	Graduation projects.
Laboratory experiments.	Industrial training.

10. Evaluation methods	
Quizzes, mid-term, and final exams.	Practical exams and homework
Reports	Seminars.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/ Skills		The number of teaching staff	
	General	**Special**			**Staff**	**Lecturer**
Professor	Mech. Engineering	Thermal Power				1
Assist. Professor	Mech. Engineering	Thermal Power				8
Assist. Professor	Mech. Engineering	Production & Metallurgy				4
Lecturer	Mech. Engineering	Thermal Power				12
Lecturer	Mech. Engineering	Applied Mechanics				8
Lecturer	Mech. Engineering	Production & Metallurgy				7
Assist. Lecturer	Mech. Engineering	Thermal Power				4
Assist. Lecturer	Mech. Engineering	Applied Mechanics				1
Assist. Lecturer	Mech. Engineering	Production & Metallurgy				2
Assist. Lecturer	Elect. Engineering	Power & Machines				1
Assist. Lecturer	Administration & Economics	Administration				1

Professional Development	
Mentoring new faculty members	
Teaching methods workshops	Training courses
Continuing education workshops	Scientific seminars, workshops, and seminars
Professional development of faculty members	
A plan to develop the skills of the faculty in the Mechanical Engineering Department by involving the largest number of them in local and international conferences. Also, they should be encouraged to join education workshops, continuous scientific seminars, workshops, and seminars that are held inside and outside the university's corridors.	

12. Acceptance Criterion

Standard admission approved by Ministry of Higher Education and Scientific Research

13. The most important sources of information about the program

Electronic scientific resources are available online.

Textbooks and references are available in the Department Education office, Department Library, College Library, and University Library.

14. Program Development Plan

An improvement plan is prepared according to a proposed timetable to improve the educational program's outcomes. Working to improve and enhance the academic program's outcomes by improving faculty members' performance through intensive educational courses, continuing education courses, publishing research papers, and completing promotion procedures to a higher academic rank. With the help of the Quality Assurance Committee and the Department's Scientific Committee, a questionnaire is being prepared directed to several government and private sector institutions to ask about their opinions on the performance of the department's graduates, in addition to their proposals towards improving and enhancing the outcomes of the program. The results of the questionnaires are collected during the academic year. The relevant committees analyze and discuss the results to make recommendations and proposals. In addition, the program outcomes are reviewed annually by the faculty in the Mechanical Engineering Department. Also, the results are analyzed to measure the extent to which the

curriculum is compatible with the labor market requirements and to determine whether there is a need for change. Based on the results of the data analysis, the department headship is informed of the proposals and recommendations reached by the faculty.

Program Skills Outline															
				Required program Learning outcomes											
Year/ Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First level 2025–2024	ME101	Engineering Mechanics-Statics I	Basic	✓	✓			✓							
	ME102	Mathematics I	Basic	✓	✓			✓							
	ME103	Manufacturing Processes I	Basic	✓	✓						✓				
	ME104	Engineering Drawing	Basic		✓										
	ME105	Physics	Basic	✓	✓			✓							
	UOM103	The Computer	Basic	✓	✓			✓					✓		✓
	UOM101	Arabic Language	Basic		✓								✓		
	ME151	Engineering Mechanics-Statics II	Basic	✓	✓			✓							
	ME152	Mathematics II	Basic	✓	✓			✓							
	ME153	Physics of Metallurgy	Basic	✓	✓			✓							
	ME154	Introduction to Electrical Engineering	Basic	✓	✓										
	ME155	Energy and Sustainability	Basic	✓					✓				✓		
	UOM102	English language I	Basic		✓										
	UOM104	Democracy and Human Rights	Basic		✓								✓		
Second stage	ME201	Engineering Mechanics-Dynamics	Basic	✓	✓		✓								
	ME202	Fluid Mechanics I	Basic	✓	✓		✓								
	ME203	Thermodynamics I	Basic	✓	✓		✓								

	ME204	Mechanics of Materials I	**Basic**	✓	✓		✓								
	ME205	Metallurgy	**Basic**	✓	✓		✓								
	ME206	Mechanical Drawing	**Basic**	✓	✓										
	UOM2050	Crimes of the Baath regime in Iraq	**Basic**		✓								✓		
	UOM2022	English Language 2	**Basic**	✓			✓		✓			✓			
	ME251	Fluid Mechanics II	**Basic**	✓	✓		✓								
	ME252	Thermodynamics II	**Basic**	✓	✓		✓								
	ME253	Mechanics of Materials II	**Basic**	✓	✓		✓								
	ME254	Engineering Mathematics	**Basic**	✓	✓										
	ME256	Mechanical Engineering Laboratory I	**Basic**	✓	✓		✓								
	UOM2032	Computer 2	**Basic**	✓								✓			
	UOM2012	Arabic Language 2	**Basic**		✓								✓		
Third stage 2025–2024		English Language - intermediate	**Basic**		✓							✓			
	ENGC325	Engineering Management	**Basic**	✓								✓			
	MEC301	Engineering Analysis	**Basic**	✓	✓		✓								
	MEC302	Conduction Heat Transfer	**Basic**	✓	✓		✓								
	MEC303	Kinematic Analysis	**Basic**	✓	✓		✓								
	MEC304	Electric Machines	**Basic**	✓						✓					
	MEC305	Mechanical Workshop	**Basic**	✓						✓	✓				

	MEC331	Compressible Fluid Flow	**Basic**	✓	✓		✓								
	MEC332	Metallurgy	**Basic**	✓			✓								
	UOMC104	Professional ethics	**Basic**			✓						✓			
	ENGE329	Public Safety	**Basic**			✓						✓			
	ENGE320	Numerical Analysis	**Basic**	✓			✓	✓	✓			✓			
	MEC352	Convection and Heat Transfer Radiation	**Basic**	✓	✓		✓								
	MEC353	Introduction to Machine Design	**Basic**	✓	✓		✓	✓							
	MEC354	Machines Dynamics	**Basic**	✓	✓		✓								
	MEC355	Laboratory II	**Basic**	✓							✓				
	MEC360	Turbomachinery	**Basic**	✓	✓		✓			✓					
	MEC361	Metallic Engineering Materials	**Basic**	✓	✓		✓								
	MEC362	Introduction to Combustion	**Basic**	✓	✓		✓			✓					
	MEC363	Medium Manufacturing Processes	**Basic**	✓						✓					
	MEC364	Solar Energy	**Basic**	✓						✓					
	MEC465	Introduction to Composite Materials	**Basic**	✓	✓										
Forth stage 2025–2024	MEC401	Introduction to Vibrations	**Basic**	✓	✓			✓						✓	
	MEC402	Internal Combustion Engines	**Basic**	✓	✓		✓			✓					
	MEC403	Intermediate Machine Design	**Basic**	✓	✓		✓	✓							

	MEC404	Engineering Project I	**Basic**	✓	✓									✓	
	MEC453	Air-conditioning	**Basic**	✓	✓		✓								
	MEC421	Power Plants	**Basic**	✓	✓		✓			✓					
	MEC422	Renewable Energy	**Basic**	✓						✓					
	MEC425	Non Metallic Engineering Materials	**Basic**	✓	✓		✓								
		English Language -Upper mediate	**Basic**		✓										
	MEC405	Control and measurements	**Basic**	✓	✓		✓			✓		✓			
	MEC452	Laboratory III	**Basic**	✓							✓			✓	
	MEC467	Intermediate Vibration	**Basic**	✓	✓		✓								
	MEC454	Engineering Project II	**Basic**	✓	✓										
	MEC461	Pollution	**Basic**	✓									✓		
	MEC462	Refrigeration	**Basic**	✓	✓		✓								
	MEC463	Computer Aided Thermal System Design	**Basic**	✓				✓							
	MEC451	Design and Analysis of Control System	**Basic**	✓				✓						✓	
	MEC466	Computer Aided Machine Design	**Basic**	✓	✓		✓	✓	✓						
	MEC465	Plasticity	**Basic**	✓	✓		✓								

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

Course Description Form

1. Course Name:	
Engineering Mechanics-Statics	
2. Course Code:	
ME101	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Ghydaa Ibrahim Email: ghaidaa.alsarraj2019@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of first-level students to predict the effects of forces, moments, and couples on bodies. • To develop problem-solving skills and an understanding of forces analysis by applying the equilibrium principle. • To understand and draw the free body diagram to analyze forces. • Analysis forces and finding their resultant forces for two- and three-dimensional systems. • Applying the equilibrium principle to simple trusses and frames. • Understand the friction phenomena and the friction force in machine parts. • Understand the centroid and center of gravity for an area and a rigid body.
9. Teaching and Learning Strategies	
Strategy	This course aims to develop the capacity of first-year students to predict the effects of forces, moments, couples, and the distributed loads that are applied to bodies. Thus, the primary strategy of this course is to encourage students' participation in discussions and to solve the exercises. Also, they should refine and expand their critical thinking skills to analyze and study the effect of applied forces on bodies. This strategy is achieved through classes, interactive tutorials, and by considering real applications that interest the students.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	Introduction to statics + Vector operations (addition, product) Cartesian force and position vectors.	lectures	Quiz
3-4	8	LO#1	Force system in 2D Addition of a system of coplanar Forces	lectures	Quiz
5	4	LO#1	Moment, couples, and resultant of forces (1) Moment, couples, and resultant of forces (2)	lectures	Quiz + Homework
6	4	LO#1, LO#3	Equations and conditions of Equilibrium System Isolation and the Free-Body Diagram (FBD)	lectures	Exam
7-8	8	LO#3	Trusses: Method of Joints + Method of Sections Frames and Machines	lectures	Homework
9-10	8	LO#1, LO#3	Center of Gravity and Centroid	lectures	Quiz
11	4	LO#1	Moment of Inertia	lectures	Quiz
12-13	8	LO#3	Moments of Inertia for Composite Areas	lectures	Homework
14	4	LO#1, LO#3	Theory of Dry Friction.	lectures	Exam

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Final	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Meriam, James L., and L. Glenn Kraige, "Engineering mechanics: statics", John Wiley & Sons, 2012.
Primary references (sources)	Hibbeler, RC, "Engineering Mechanics Statics", 1 edition, 2016.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Mathematics I	
2. Course Code:	
ME102	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Omer S. Alabidalkreem Email: omerphd18@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Write clear mathematical arguments including effective use of physical equations. • Develop a solid understanding of the fundamental principles of physics, including: • a firm conceptual grasp of the central principles of physics, • an ability to work with the concepts mathematically, and • a functional understanding of how these ideas play out in the real world. • Use graphs and diagrams to convey results. • Decide on strategies to be used and assumptions that need to be made.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	Domain and Range, algebraic function, and trigonometric function	lectures	Quiz
3-4	8	LO#1	.Equation of straight line (examples and solved problems).	lectures	Quiz
5	4	LO#1	Limit of algebraic function.	lectures	Quiz + Homework
6	4	LO#1, LO#3	Limit of trigonometric function, rules of limit and examples.	lectures	Exam
7-8	8	LO#3	Definition of derivative,	lectures	Homework
9-10	8	LO#1, LO#3	Differentiation of algebraic function.	lectures	Quiz
11	4	LO#1	Differentiation of trigonometric function.	lectures	Quiz
12-13	8	LO#3	Principles, vectors in two dimensions, vector in space, properties of vectors	lectures	Homework
14	4	LO#1, LO#3	Examples and solves problems.	lectures	Exam

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Meriam, James L., and L. Glenn Kraige, "Engineering mechanics: statics", John Wiley & Sons, 2012.
Primary references (sources)	Hibbeler, RC, "Engineering Mechanics Statics", 1 edition, 2016.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Manufacturing Processes I	
2. Course Code:	
ME103	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
1/6/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
150 / 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Mohammed Najeeb Abdullah Email: moh_77@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Sustainable practices in manufacturing operations • Understand the role of manufacturing processes in converting raw materials into final products. • The influence of engineering materials properties on manufacturing processes. • Exploring factors affecting material selection. • To gain knowledge of machine tools, cutting tools, process parameters, and the application of machining processes. • To explore various joining processes used to combine different components and materials. • To learn about the equipment, tooling, and techniques involved in material removal processes. • To analyze manufacturing requirements, select appropriate processes, and comprehend the interactions between materials, methods, and product design
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be encouraging students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, lab experiments, and the consideration of simple experiments involving sampling activities that students find interesting.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	12	LO#1, LO#2	Engineering materials, Physical and Mechanical Properties, Industrial Safety	lectures	Quiz
3-4	12	LO#1, LO#2	Metrology, Measuring Tools, Sources of Error in measurement	lectures	Quiz
5	6	LO#1	Production of metals (ferrous & non-ferrous) (1)		
6	6	LO#1, LO#3	Primary manufacturing processes - casting, furnaces		
7-8	12	LO#2	Machining Processes, introduction, types of cutting operations (1)		
9-10	12	LO#1, LO#3	Theory of chip formation. Forces in metal cutting.		
11	6	LO#1	Power and energy relations in cutting operations		
12-13	12	LO#3	Turning and related operations, Milling operations Drilling and Grinding Operations		
14	6	LO#1, LO#3, LO#5	Tool failure and Wear, Tool Life, Economics of Metal Cutting,		

11. Course Evaluation

Task	Weight (Marks)
Homework	15 point
Quizzes	15 point
Projects	0 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Manufacturing methods and processes, Ahmed Al-Khatib and Khaled Ayoub, Mosul University / Dar Al-Kutub for printing and publishing, 1981.
Primary references (sources)	Principles of production processes, Qahtan Khalaf Khazraji, Adel Mahmoud Hassan, second edition, 1987
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Engineering Drawing	
2. Course Code:	
ME104	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
10/10/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
150 / 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Nooraldeen Saleh Khidier Email: nooralelln2017@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Students will be able to: • 1. Drawing engineering shapes manually and clearly, including the effective use of the computer-aided drawing program (AutoCAD). • 2. Develop a solid understanding of the basic principles of engineering drawing, Included: a. Solid conceptual understanding of the central principles of engineering drawing, b. The ability to work with concepts, analytically, and visualize them c. A functional understanding of how these ideas will manifest in the real world. • Use the graphic results of a specific design and convert them into engineering drawings. • Determine the strategies to be used and the assumptions to be made. • Use both manual and computer approaches in drawing figures.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	12	LO#1	Introduction to engineering drawing and its tools , Point The types of line and its properties , Line	lectures	Quiz
3-4	12	LO#1	Engineering shapes and the arcs , lamina. , Dimensions Engineering shapes and the arcs , lamina. , Dimensions	lectures	Quiz
5	6	LO#1	Engineering shapes and the arcs , lamina. , Dimensions	lectures	Quiz + Homework
6-9	24	LO#1 LO#3	Multi view projection Perpendicular Projection Theory of Objects	lectures	Exam
10-12	18	LO#3	Isometric drawing Types of three-dimensional figures and their practical benefits Isometric	lectures	Homework
13	6	LO#3	The section in Isometric • FULL SECTION • HALF SECTION • OFFSET SECTION	lectures	Quiz
14-15	12	LO#1	Drawing the third Missing View of the body	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	15 point
Report	5 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	"NGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Thirteen Edition, By: THOMAS E.FRENCH, CHARLES .VIERCK, ROBERT J.FOSTER
Primary references (sources)	WilliamD.CallisterJr.&David D.Rethwisch.(2010)"Material Science and Engineering An introduction", eightEdition.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
English Language I	
2. Course Code:	
ME105	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
10/10/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
50 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed Fouad Mahmood Email: ahmedfalneama@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• The main objective of this course is to emphasize the fundamental language skills of reading, writing, speaking, listening, thinking, viewing, and presenting. • The course includes studies of various literary genres: short story, novel, and non-fiction. • The course also helps students to improve their English language grammar and reading abilities, and becoming more effective use of grammar and natural self-expression in English.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#5	Parts of speech. Pronouns.	lectures	Quiz
2-4	6	LO#5	Subject, Lexical verbs, Auxiliry verbs, Regular Verb, Irregular Verb. Recognizing Objects and Complements. Adverbials.	lectures	Quiz
5-6	4	LO#5	Tenses.	lectures	Quiz + Homework
7-8	4	LO#5	**Active voice. Passive voice.**	lectures	Exam
9-10	4	LO#5	Convert from active voice to passive voice and vice versa. Positive, comparative and superlative.	lectures	Homework
11-12	4	LO#5	Conditional sentences, if-clauses type I, II, III. Reading some of passages from IELTS books.	lectures	Quiz
13	2	LO#5	English reading practice for beginners.		
14-15	4	LO#5	Writing some of passages from IELTS books. English writing practice for beginners.	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	20 point
Projects	0 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Ronald Carter and Michael McCarthy. Cambridge grammar of English: A comprehensive guide. Cambridge: Cambridge University Press, 2006.
Primary references (sources)	WilliamD.CallisterJr.&David D.Rethwisch.(2010)"Material Science and Engineering An introduction", eightEdition.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Engineering Mechanics Dynamics	
2. Course Code:	
ME151	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
1/1/2025	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Bakr Noori Alhasan Email: bakralhasan@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To present the basic principles of dynamics and help develop proficiency in applying these principles to formulate and solve dynamics problems. • To acquire skills in mathematics and physics to solve practical problems of Dynamics. • To Apply a general analysis approach to solving kinematics problems. • To define and calculate the linear and angular velocities and accelerations for systems of 2D rigid bodies in translation, rotation about a fixed axis, and general planar motion. • To solve 2D kinetics problems using force-acceleration, work-energy, and impulse-momentum methods for particles and rigid bodies. • To calculate the mass moment of inertia for solids and composite bodies.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module is to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Introduction to Dynamics.	lectures	Quiz
2-4	12	LO#1	Kinematics of Particles: Plane curvilinear motion (1). Kinematics of Particles: Plane curvilinear motion (2). Kinematics of Particles:	lectures	Quiz
5-6	8	LO#2	Kinetics of particles: Direct applications of Newton's 2nd law. Kinetics of particles: Work and energy.	lectures	Quiz + Homework
7-8	8	LO#1	Impulse and Momentum. Special applications; Impact.	lectures	Exam
9-11	12	LO#2	Kinematics of Rigid Bodies	lectures	Homework
12-13	8	LO#1	Direct applications of Newton's 2nd law	lectures	Quiz
14	4	LO#2	Work and Energy.		
15	4	LO#1	Impulse and momentum.	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	20 point
Projects	0 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering Mechanics: Dynamics - Volume 2. J.L. Meriam, L.G. Kraige and J. N. Bolton. 8th edition, 2015.
Primary references (sources)	**Engineering Mechanics' Dynamics",** R. C. Hibbeler
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Mathematics II	
2. Course Code:	
ME152	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
1/1/2025	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100/ 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Omer S. Alabidalkreem Email: Omerphd18@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Students will be able to: • Write clear mathematical arguments including effective use of physical equations. • Develop a solid understanding of the fundamental principles of physics, including: • a firm conceptual grasp of the central principles of physics, • an ability to work with the concepts mathematically, and • a functional understanding of how these ideas play out in the real world. • Use graphs and diagrams to convey results. • Decide on strategies to be used and assumptions that need to be made. • Use both algebraic and geometric approaches in problem-solving.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Introduction to integral.	lectures	Quiz
2-3	8	LO#1	Estimation of the area between/under curves.	lectures	Quiz
4-5	8	LO#2	Solid / Hollow object volume calculation by using disk method.	lectures	Quiz + Homework
6-7	8	LO#1	Solid object volume calculation by using shell method. Hollow object volume calculation by using shell method.	lectures	Exam
8-10	12	LO#2	Calculate the area of the surface revolution. Calculate the length of any curve. Natural logarithm function.	lectures	Homework
11-12	8	LO#1	Logax.Hyperbolic function. Inverse of hyperbolic function.	lectures	Quiz
13-14	8	LO#2	Integration by parts. Trigonometric. Integration of Rational Functions.		
15	4	LO#1&2	Solved Problems.	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	20 point
Projects	0 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus and Analytic Geometry by George B. Thomas, any edition.
Primary references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Physical Metallurgy	
2. Course Code:	
ME153	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
1/1/2025	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
150/ 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed S. Abdalaziz Email: Ahmed.sadoon@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of first-level students to recognize types of metals, their properties, and applications. • To develop problem-solving skills and an understanding of forces analysis by applying the equilibrium principle. To enrich students' knowledge and develop their skills in the principle of heat treatments of steels and cast irons. • To understand the macro- and microstructure of metal s. • Analysis of the phase diagrams of alloy systems and understanding their effect on mechanical properties of metals. • Applying the equilibrium principle to simple trusses and frames.
9. Teaching and Learning Strategies	
Strategy	This course aims to enrich the knowledge of first-level students about the general aspects of metallurgy and engineering materials, including classifications of metals and their properties, mechanical tests, atomic structure, atomic bonding, miller indices, alloy systems, and microstructures. Thus, the primary strategy of this curse is to encourage students to recognize different types of materials in real life. Also, to refine their thinking skills to analyze the microstructure of metals and understand their effects on the mechanical properties of metals. This strategy is achieved through classes, interactive discussions, different lab experiments, seminars, and by considering real applications.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	10	LO#1	Introduction to Materials and Properties.	lectures	Quiz
3	5	LO#1	Structure examination	lectures	Quiz
4-5	10	LO#2	Atomic structure, atomic bonding in materials. Miller indices Solidification of metals and alloys	lectures	Quiz + Homework
6-7	10	LO#1	Cooling curves, types, and constructions Phase diagram for alloy systems..	lectures	Exam
8-9	10	LO#2	Thermal equilibrium diagrams.	lectures	Homework
10-12	15	LO#1	Ferrous alloys and Iron-Carbon system.	lectures	Quiz
13-14	10	LO#2	Microstructural transformation and heat treatment.		
15	5	LO#1&2	Solved Problems.	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	15 point
Projects	5 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	-"Fundamentals of material science and engineering", William.d.callister, 4th ed., John weily & sons, 2012, U.S.A
Primary references (sources)	Technology of engineering materials, M. Philip & W. Bolton, BH, 2002, London.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Introduction to Electrical Engineering	
2. Course Code:	
ME154	
3. Semester / Year:	
Spring semester / 2024	
4. Description Preparation Date:	
July 1, 2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total)	
150/6	
7. Course administrator's name (mention all, if more than one name)	
Name: Maan Hussein Email: maanhussein1991@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	An ability to distinguish, identify, define, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (by applying circuit analysis techniques such as Ohm's Law, Kirchhoff's Voltage and Current Laws, and network theorems (Thevenin, Norton, etc.) An ability to create and carry out proper measurements and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	5	#1	Standard international units and introduction to basic components	**Lecture**	
Week 2	5	#1	Resistance and conductivity, Ohm 's law,.	**Lecture**	
Week 3	5	#1	Kirchhoff's laws	**Lecture**	**Assignments**
Week 4	5	#1	Loop analysis	**Lecture**	
Week 5	5	#1	Nodal analysis	**Lecture**	**Quizzes**
Week 6	5	#1	Thevenin's theorem	**Lecture**	
Week 7	5	#1	Norten's theorem	**Lecture**	**Assignments**
Week 8	5	#1	DC circuit analysis examples	**Lecture**	
Week 9	5	#2	Alternating current circuits	**Lecture**	**Report**
Week 10	5	#2	Complex numbers &polar representation	**Lecture**	
Week 11	5	#2	Power triangle	**Lecture**	**Quizzes**
Week 12	5	#2	p.f. correction	**Lecture**	**Midterm Exam**
Week 13	5	#2	Three phase circuits	**Lecture**	
Week 14	5	#2	Material 's electric	**Lecture**	**Assignments**
Week 15	5	#2	Delta –star and star –delta	**Lecture**	

11. Course Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	5, 11	LO # 1
	Assignments	3	5% (5)	3,7,14	LO # 1
	Practical	1	10% (10)	15	LO # 2 and 3
	Report	1	5% (5)	9	LO# 2
Summative assessment	**Midterm Exam**	1hr	10% (10)	12	LO # 1 and 2
	Final Exam	3hr	50% (50)	16	All
Total assessment					100% (100 Marks)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	أصول الهندسة الكهربائية لطلبة كلية الهندسة
Main references (sources)	A Text book of electric technology B.L.Theraja.
Recommended books and references (scientific journals, reports…)	Engineering circuit analysis William H.Hayt.
Electronic References, Websites	

Course Description Form

1. Course Name:
Computer Programming I
2. Course Code:
ME155
3. Semester / Year:
Spring /2024-2025
4. Description Preparation Date:
1/1/2025
5. Available Attendance Forms:
Presence/online
6. Number of Credit Hours (Total) / Number of Units (Total):
75 / 3
7. Course administrator's name (mention all, if more than one name)
Name: Eman Mohammed Ali Email: emanmali@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Students will be able to: • To introduce engineering students to the fundamental concepts and principles of programming. • To develop the skills necessary for engineering students to solve engineering problems using programming. • To foster a problem-solving mindset and logical thinking in the context of engineering applications. • Understand the main features of the MATLAB development environment. • Design simple algorithms to solve problems. • Write simple programs in MATLAB to solve scientific and mathematical problems.

9. Teaching and Learning Strategies

Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, And the implementation of the programs explained in the theoretical lectures, in addition to motivating the student to write codes inside the laboratory

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	LO#1	Starting with MATLAB. Defining scalar variables	lectures	Quiz
3	3	LO#1	Script files	lectures	Quiz
4-5	6	LO#6	Creating Arrays	lectures	Quiz + Homework
6-8	9	LO#1	Mathematical operations with arrays Using script files and managing data User-defined function and function files	lectures	Exam
9-10	6	LO#6	Programming in MATLAB	lectures	Homework
11-12	6	LO#1	Application in numerical analysis: solving an equation with one variable, ordinary differential equations, and examples of Engineering applications	lectures	Quiz
13-14	6	LO#6	Two-dimensional plots. plot with error bars		
15	3	LO#1&6	Three-dimensional plots	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Stormy Attaway, "A Practical Introduction to Programming and Problem Solving", August 6, 2016, 4 th Edition, ISBN-13: 978-0128045251
Primary references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Fluid I	
2. Course Code:	
ME201	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Taha Ahmed Abdullah Email: Tahatahamir100@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Students will be able to: 1. Classify the fluid properties (compressibility, elasticity, viscosity, surface tension, capillarity). 2. Measure pressure by all types of manometers. 3. Calculate the forces on the immersed bodies and surfaces. 4. Analyze the fluid when subjected to Rotation & linear acceleration. 5. Apply Conservation of mass, continuity equation, Equations of motions- Euler's, Bernoulli's, and work-energy equations. 6. Apply Impulse - Momentum principles and applications. 7. Develop their ability to communicate ideas of science. 8. Identify what they don't understand, and ask specific questions in order to gain understanding. 9. Develop an expertise in experimental methodologies.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	An introduction to the fundamental of fluid mechanics	lectures	Quiz
2-4	12	LO#1	Compressibility and elasticity viscosity surface tension, capillarity, vapor pressure	lectures	Quiz
4-6	8	LO#1	capillarity, vapor pressure Pressure applications and measurements	lectures	Quiz + Homework
7-9	12	LO#3	Forces on immersed bodies – vertical plane surfaces inclined plane surfaces curved surfaces	lectures	Exam
10-11	8	LO#3	Fluid subjected to linear acceleration Introduction to fluid motion	lectures	Homework
12-13	8	LO#1, LO#3	Equations of motions- Euler's and Bernoulli's Conservation of energy	lectures	Quiz
14	4	LO#1	Work-Energy Equations	lectures	Quiz
15	4	LO#3	Momentum equation	lectures	Homework

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Elementary Fluid Mechanics Vennard and Street. 6thedition, 1982.**
Primary references (sources)	**Bruce R. Munson, Donald F. Young a Theodore H. Okiishi, 2002. "Fundamentals Fluid Mechanics"**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Thermodynamic I	
2. Course Code:	
ME202	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/8/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Younis Najim Email: mahalyounis@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Identify the terminology and definitions associated with thermodynamics, review unit system, properties of a system such as density, pressure, temperature and specific heats. 2. Introduce a systematic steps for solving thermodynamic problems. 3. Understand the concept of energy and the definition of its various types, especially, internal energy of a system. 4. Understand the concept of heat and the way energy transfer by heat. 5. Define the concept of work. 6. Introduce the first law of thermodynamics and energy balance.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Introduction, concept, and definitions	lectures	Quiz
2-4	12	LO#1	Energy, heat, work, First law of thermodynamics Properties of pure substances, property tables	lectures	Quiz
5-6	8	LO#1	Ideal Gases, real gases, compressibility ratio. Energy analysis	lectures	Quiz + Homework
7-9	12	LO#3	Energy analysis Isobaric and Isochoric Process Isothermal process	lectures	Exam
10-11	8	LO#3	Adiabatic and polytropic processes Mass and energy analysis of control volume	lectures	Homework
12-13	8	LO#1, LO#3	Steady- and unsteady flow, energy balance Nozzles, compressors, turbines	lectures	Quiz
14	4	LO#1	Throttling valves, mixing chambers, and heat exchangers	lectures	Quiz
15	4	LO#3	Introduction to second law of thermodynamic	lectures	Homework

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Yunus A. Cengel and Michael A. Boles. Thermodynamics: An Engineering Approach, 7th Ed. McGraw Hill, 2011.
Primary references (sources)	Borgnakke, C. and Sonntag, R. E., Fundamentals of Thermodynamics, 7th Ed., John Wiley & Sons, 2009.
Recommended books and references (scientific journals, reports...)	

Course Description Form

1. Course Name:	
Mechanics of Materials I	
2. Course Code:	
ME203	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Omar A. Mohammed Email: omar.a.mohammed@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Explaining the behavior of solid bodies subjected to various types of loading. 2. Integrating the knowledge of the strength of materials in engineering design and their applications. 3. Understanding of structural members and their strength, stiffness, and stability. 4. Develop the capability to solve practical engineering problems involving stress and strain analysis in elementary structural members, such as bars and beams. 5. Understanding structure strength, stiffness, and stability concepts are needed for engineering analysis and design. 6. Develop the capability to design new structural members based on strength and stiffness requirements. 7. Develop the capability to check and verify the safety of existing or designed structures.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Simple stress and strain	lectures	Quiz
2-4	12	LO#1	Thermal stress, shear stress Compound bars (statically indeterminate problems)	lectures	Quiz
5-7	12	LO#1	Distributed Load, Shear, and Moment Shearing force and bending moment for beams	lectures	Quiz + Homework
8-9	8	LO#3	Moment of Inertia: Products of Inertia Simple bending theory, Bending stress of beams	lectures	Exam
10-11	8	LO#3	Shearing stress of beams	lectures	Homework
12-13	8	LO#1, LO#3	Slope and deflection of beams	lectures	Quiz
14	4	LO#1	Torsion of circular shafts (1)	lectures	Quiz
15	4	LO#3	Torsion of circular shafts (2)	lectures	Homework

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	J. Hearn. "Mechanics of Materials 1: An Introduction to elastic and plastic deformation of solids and structural materials ", 3rd edition, 2010.
Primary references (sources)	R. C. Hibbeler. "Strength of Materials". 12th edition 2012. (Can be downloaded from the Course web page).
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Engineering Mathematics
2. Course Code:
ME204
3. Semester / Year:
Fall /2024-2025
4. Description Preparation Date:
7/2/2024
5. Available Attendance Forms:
Presence/online
6. Number of Credit Hours (Total) / Number of Units (Total):
100 / 4
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Muyassar Edris Ismaeel Email: Muyassar.alhasso@uomosul.edu.iq
8. Course Objectives

Course Objectives	By enrolling in the Engineering Mathematics course, students will acquire the essential skills and knowledge needed to effectively solve simple engineering problems using mathematical techniques

9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes and interactive tutorials.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	Vectors and the Geometry of Space	lectures	Quiz
3	4	LO#1	Introduction to Multivariable Functions	lectures	Quiz

4-5	8	LO#1	Partial Derivatives Shearing force and bending moment for beams	lectures	Quiz + Homework
6-7	8	LO#3	Multiple Integrals	lectures	Exam
8	4	LO#3	Fourier Analysis	lectures	Homework
9-12	16	LO#1, LO#3	Ordinary and Partial Differential Equation	lectures	Quiz
13-15	12	LO#1	Laplace transform	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Weir, M.D., Hass, J., Heil, C. and Thomas, G.B., 2014. Thomas' Calculus: Single Variable: Based on the Original Work by George B. Thomas, Jr. Pearson.
Primary references (sources)	Advanced Engineering Mathematics, DIFFERENTIAL EQUATIONS with Boundary-Value Problems a Zill Cullen-Zill-6rd-Edition-Solutions, 2018.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Computer Programming II	
2. Course Code:	
ME205	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Eman Mohammed Ali Email: emanmali@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Use MATLAB to display data and equations graphically or in tabular form. 2. Write and execute MATLAB script files to solve math, science, and engineering-related problems. 3. Use loops, selection structures, and input/output commands in MATLAB. 4. Model data in MATLAB by curve-fitting with polynomials and by using interpolation. 5. Use MATLAB to solve a system of simultaneous equations, to find roots of polynomials, and to solve other single-variable equations. 6. Perform numerical integration and differentiation using MATLAB. 7. Implement engineering algorithms and techniques for system analysis.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, And the implementation of the programs explained in the theoretical lectures, in addition to motivating the student to write codes inside the laboratory

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	MATLAB interface, user input and output, variables, operators	lectures	Quiz
3	4	LO#1	Programming in MATLAB: M-file scripts	lectures	Quiz
4	4	LO#1	Programming in MATLAB: M-file functions Flow control: If-statement	lectures	Quiz + Homework
5-7	12	LO#3	Flow control: If-statement While loops, break, continue For-loops	lectures	Exam
8	14	LO#3	Functions, data analysis and plotting	lectures	Homework
9-11	12	LO#1, LO#3	Mathematical computing with MATLAB	lectures	Quiz
12	4	LO#1	Debugging M-File	lectures	Quiz
13-15	12	LO#1	Introduction to Simulink with Engineering applications	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Stormy Attaway, "A Practical Introduction to Programming and Problem Solving", August 6, 2016, 4 th Edition, ISBN-13: 978-0128045251
Primary references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
English Language II	
2. Course Code:	
ME206	
3. Semester / Year:	
Fall /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
50 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Mohanad Kamil Radhi Email: Radhi83@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Distinguish between dependent, Independent, and Integrated essays. • Find the topic and the thesis statement of short essays. • Identify the main ideas from the introduction paragraph. • Identify the main ideas from the body paragraph. • Find the supporting details from the introduction paragraph. • Find the supporting details from the body paragraph. • Draw an outline to link the ideas, supporting details, and essay topic. • Make notes in response to an essay question to create main ideas, supporting details, and thesis statement. • Write the introduction paragraph on basis of the thesis statement and main ideas.
9. Teaching and Learning Strategies	
Strategy	The approach to be followed here is to motivate students to analyze previously written model essays to understand the standard structure of academic essays then implement the same procedures to build their own essays.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	Overview of Academic Essays Structure of academic essays	lectures	Quiz
3	4	LO#1	Topic sentence and thesis statement	lectures	Quiz
4-5	8	LO#1	Main Ideas. Supporting Details	lectures	Quiz + Homework
6-7	8	LO#3	Essay outlines Essay Questions	lectures	Exam
8-9	8	LO#3	Topic Sentence Personal Thoughts	lectures	Homework
10	4	LO#1, LO#3	Idea Map Creation	lectures	Quiz
11-12	8	LO#1	Transition words and sentence starters Increasing the fluency Writing the Introduction	lectures	Quiz
13-14	8	LO#1	Writing the Conclusion Introduction to dependent writing tasks	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	No Textbook is required for this course. Supplemental materials will be provided by provided by the instructor.
Primary references (sources)	*Sharpe, P. J. (2009). Barron's TOEFL iBT. Barron's Educational Series.*
Recommended books and references (scientific journals, reports...)	*Lougheed, L. (2016). Barron's Ielts with M Cd. Barron's.*
Electronic References, Websites	

Course Description Form

1. Course Name:	
Fluid Mechanics II	
2. Course Code:	
ME251	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed Khalid Ibrahim Email: Alnajar.ahmed9@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Write clear physical and mathematical arguments including effective use of fluid equations. • Develop a solid understanding of the fundamental principles of fluid. • Use graphs and diagrams to convey results. • Decide on strategies to be used and assumptions that need to be made. • Use both algebraic and geometric approaches in problem-solving. • Develop a flexible and creative problem-solving ability. • Develop an integrated understanding of the unity of fluid.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Introduction and review of the kinematics of the flow field.	lectures	Quiz
2-3	8	LO#1	Impulse – momentum principles and applications.	lectures	Quiz
4-5	8	LO#1	Propellers and impulse turbines.	lectures	Quiz + Homework
6-7	8	LO#3	Pipe fittings.	lectures	Exam
8-9	8	LO#3	Similitude and dimensional analysis.	lectures	Homework
10-11	8	LO#1, LO#3	Flow of real fluids – basic concepts of external, internal, laminar and turbulent flow.	lectures	Quiz
12-13	8	LO#1	Definition of boundary layer.	lectures	Quiz
14-15	8	LO#1	Friction losses in pipes. Lift and Drag.	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Fluid Mechanics Fundamentals And Applications,** Çengel, Yunus A., 2006, Mcgraw-Hill Higher Education.
Primary references (sources)	***Fluid Mechanics,*** *Frank M. White., seventh edition, 2009, Mcgraw-Hill series in mechanical engineering.*
Recommended books and references (scientific journals, reports...)	***Fluid Mechanics,*** *Russell Hibbeler. 2 Edition, 2017.*
Electronic References, Websites	

Course Description Form

1. Course Name:	
Thermodynamic II	
2. Course Code:	
ME252	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Younis Najim Email: mahalyounis@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Introduce ME students to the second law of thermodynamics and provide them examples from real engineering applications. Identify valid processes as those that satisfy both the first and second laws of thermodynamics. Reversible and irreversible process. • Apply the second law of thermodynamics to cycles and cyclic devices starting from idealized Carnot cycle including Carnot heat engines, refrigerators, and heat pumps. • Determine the expressions for the thermal efficiencies and coefficients of performance for reversible heat engines, heat pumps, and refrigerators. • Define entropy to quantify the second-law effects. Establish the increase of entropy principle and how to calculate the entropy changes that take place during processes for pure substances, incompressible substances, and ideal gases.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Introduction to the Second Law of Thermodynamic	lectures	Quiz
2-3	8	LO#1	Reversible and Irreversible Process Carnot Cycle and Thermal Efficiency	lectures	Quiz
4-5	8	LO#1	Introduction to Entropy. Entropy calculation for solid, liquid and Ideal gases	lectures	Quiz + Homework
6-7	8	LO#3	Isentropic Processes and Entropy balance Exergy and exergy balance of closed system	lectures	Exam
8-9	8	LO#3	Exergy balance of control volume Power cycles, Otto cycle,	lectures	Homework
10-11	8	LO#1, LO#3	Diesel and Dual Cycle Brayton cycles. Brayton cycle with intercooling, reheating, and regeneration.	lectures	Quiz
12-13	8	LO#1	Vapor power cycles Rankine with superheat and reheat	lectures	Quiz
14-15	8	LO#1	Vapor and Combined Power Cycles Introduction to Refrigeration cycle	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Yunus A. Cengel and Michael A. Boles. Thermodynamics: An Engineering Approach, 7th Ed. McGraw Hill, 2011.**
Primary references (sources)	***Borgnakke, C. and Sonntag, R. E., Fundamentals of Thermodynamics, 7th Ed., John Wiley & Sons, 2009***
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Mechanics of Materials II
2. Course Code:
ME253
3. Semester / Year:
Spring /2024-2025
4. Description Preparation Date:
2/1/2025
5. Available Attendance Forms:
Presence/online
6. Number of Credit Hours (Total) / Number of Units (Total):
100 / 4
7. Course administrator's name (mention all, if more than one name)
Name: Ziad Shakeeb Al Sarraf Email: ziadalsarraf@uomosul.edu.iq
8. Course Objectives

Course Objectives	• To calculate stresses, strains, shear stresses, shear strains, and deformations of objects under external loadings. • To increase the knowledge of the strength of materials in engineering design and their applications. • To build the necessary theoretical background for further structural analysis and design courses.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	LO#1	Thin cylindrical and spherical vessels	lectures	Quiz
3-4	8	LO#1	Thick cylindrical and spherical vessels	lectures	Quiz
5-6	8	LO#1	Complex stresses	lectures	Quiz + Homework
7-8	8	LO#3	Complex strains	lectures	Exam
9-10	8	LO#3	Buckling of columns	lectures	Homework
11	4	LO#1, LO#3	Flanged bolt couplings	lectures	Quiz
12-13	8	LO#1	Theories of elastic failure	lectures	Quiz
14-15	8	LO#1	Stress analysis Applications by computer	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**J. Hearn. "Mechanics of Materials 1: (Strength of Materials), An Introduction to elastic and plastic deformation of solids and structural materials ", 3rd, 2010.**
Primary references (sources)	***R. C. Hibbeler. "Strength of Materials". 12th edition or any new edition 2012. (Can be downloaded from the Course web page).***
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Mechanical Engineering Laboratory I	
2. Course Code:	
ME254	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
75 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Ali G. Mohammed Email: aligm@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To apply knowledge of mathematics, science, and engineering • To design and conduct experiments, as well as to analyze and interpret data • To identify, formulate, and solve engineering problems • To communicate effectively as teamwork. • Recognition ability to engage in life-long learning • To use the techniques, skills, and modern engineering tools necessary for engineering practice
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10.Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1-2	6	LO#1	Tensile Test	lectures	Quiz
3-4	6	LO#1	Hardness Test	lectures	Quiz
5-6	6	LO#1	Universal Beam	lectures	Quiz + Homework
7-8	6	LO#3	Moment of Inertia of Flywheel	lectures	Exam
9-10	6	LO#3	Adiabatic Index	lectures	Homework
11-12	6	LO#1, LO#3	Rope-belt Friction	lectures	Quiz
13-14	6	LO#1	Engine Model	lectures	Quiz

11.Course Evaluation	
Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Primary references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Mechanical Drawing	
2. Course Code:	
ME255	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
10/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
100 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed Khalid Ibrahim Email: alnajar.ahmed9@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To further knowledge of computer generated engineering drawing. • To create, edit and print a variety of technical drawings using a CAD system. • To develop comeptence with office applications to communicate and demontstrate professional knowledge. • Decide on strategies to be used and assumptions that need to be made. • Use both algebraic and geometric approaches in problem-solving. • Develop a flexible and creative problem-solving ability. • Develop an integrated understanding of the mechanical drawing. • Examine intermediate results or other quantities that could be used to ensure a solution is physically reasonable.
9. Teaching and Learning Strategies	
Strategy	Study of detail drawings with dimensioning and tolerances, sectioning techniques, orthographic projection, and pictorial drawings. Topics covered include: Geometric Dimensioning and tolerance techniques, the dimensioning standard, pictorial drawings, auxiliary views, sections, fasteners, and the creation of assembly and detail drawings. Introduce students to the principals of mechanical drawing employing Computer-Aided-Drafting techniques.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	LO#1	Introduction; syllabus Permanent fastening	lectures	Quiz
3-4	6	LO#1	Introduction to basic CAD concepts using AutoCAD. Temporary fastening	lectures	Quiz
5-6	6	LO#1	Use the AutoCAD software co-ordinate system to aid accurate drawing Tolerances and Fit	lectures	Quiz + Homework
7-8	6	LO#3	se absolute/relative/polar X, Y co-ordinate system to produce basic measured objects through keyboard entry Couplings	lectures	Exam
9-10	6	LO#3	Create/edit basic block. Bearings	lectures	Homework
11-12	6	LO#1, LO#3	Create basic dimension styles to suit viewport scales Coupler joint	lectures	Quiz
13-14	6	LO#1	Share data working with other applications Word and Excel Assembly drawings; Valve	lectures	Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Engineering Drawing and Design, David A. Madsen, 1989.**
Primary references (sources)	**Mechanical Drawing Board & CAD Techniques, Student Edition, McGraw-Hill Education, 1997.**
Recommended books and references (scientific journals, reports...)	**Machine drawing, R.K.DHAWAN. 2008.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Metallurgy	
2. Course Code:	
ME256	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence/online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
125 / 5	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed N. Rashid Email: Ahmed.n.rashid@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of third-year students to recognize types of Binary alloy systems for ferrous metals & Ternary alloy systems. • To develop skills and an understanding of Alloy steels. • To enrich students' knowledge and develop their skills in alloy steels' heat treatments and engineering applications. • To understand the hardenability and surface hardening of steel. • To understand nonferrous metals and alloys and bearing metals.
9. Teaching and Learning Strategies	
Strategy	This course aims to enrich the knowledge of second-level students about applied metallurgy of ferrous metal, including binary alloy systems and ternary alloy systems, ad heat treatments, and engineering applications. Thus, the primary strategy of this curse is to encourage students to recognize different types of materials in real life. Also, to refine their thinking skills to analyze the microstructure of metals and understand their effects on the mechanical properties of metals. As a result, students will evaluate and recognize the relationship between the microstructure transformation of metals and their properties and applications. This strategy is achieved through classes, interactive discussions, different lab experiments, seminars, and by considering real applications.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	LO#1	Binary alloy systems for ferrous metals	lectures	Quiz
2-3	8	LO#1	Ternary alloy systems	lectures	Quiz
4-5	8	LO#1	Alloy steels: alloying elements, heat treatments, and engineering applications.	lectures	Quiz + Homework
6-8	12	LO#3	Hardenability and surface hardening Nonferrous metals and alloys	lectures	Exam
9-10	8	LO#3	Bearing metals Deformation and defects of metals.	lectures	Homework
11-12	8	LO#1, LO#3	Strengthening mechanisms of metals	lectures	Quiz
13-14	8	LO#1	Failure of metals	lectures	Quiz
15	4	LO#1	International specification of metals and alloys		Quiz

11.Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quizzes	10 point
Projects	10 point
Report	10 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**-"Fundamentals of material science and engineering", William.d.callister, 4th ed., John weily & sons, 2012, U.S.A**
Primary references (sources)	**Engineering metallurgy", R. A. Higgins, part I, 6th ed, London**
Recommended books and references (scientific journals, reports...)	**Technology of engineering materials, M. Phi & W. Bolton, BH, 2002, London.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Engineering Analysis	
2. Course Code:	
MEC301	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Saddam Atteyia Mohammad Email: saddamatteyia@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course covers different analytical topics, including special functions (Gamma function and Beta function), Partial differential equations, PDEs (One-dimensional wave equation, one-dimensional heat equation, two-dimensional Laplace equation), and Complex number. The course's objective is to study advanced mathematics methods to solve engineering problems.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Understand some special functions (Gamma function and Beta function). 2. Using mathematical manipulation to solve problems of Gamma and Beta functions. 3. Understand the basic concepts of partial differential equations and the related initial and boundary conditions. 4. Classifying the types of partial differential equations. 5. Applying separation of variables method to solve wave, heat, and Laplace equations. 6. Formulating the general and particular solutions of partial differential equations. 7. Finding solutions to complex numbers.
10. Course Structure	

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

1	2	LO#1	Special functions: Gamma function with solution of problems.	lectures	
2-3	4	LO#1	Solution of problems on Gamma function.	lectures	Homework#1
4-5	4	LO#1	Beta function with solution of problems.		Quiz
6-7	4	LO#1, LO#2	Solution of problems on Beta function.	lectures	Homework#2
7-8	4	LO#2	Partial differential equations PDEs	lectures	Quiz
9-10	4	LO#1, LO#2	Laplace equation and its solution with solution of problems.	lectures	
11	3	LO#1	Complex number, complex plane		report
12	6	LO#2	The polar form of complex numbers	lectures	
13-14	2		Integer powers of Z, roots, solution of problems.	lecture	
15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quiz	10 point
Problem-Based Learning exam	5 point
Term Exam	20 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Erwin Kreyszig, Herbert Kreyszig, and Edward J. Norminton, "Advanced Engineering Mathematics", Tenth Edition, John Wiley & Sons, 2011.
Primary references (sources):	K. A. Stroud and Dexter J. Booth, “Advanced Engineering Mathematics ", Fourth Edition, Palgrave Macmillan, 2003.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code: agwgoin**	

Course Description Form

1. Course Name:	
Conduction Heat Transfer	
2. Course Code:	
MEC301	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Adnan Mohammed. Al- Saffawi Name: Maan Saad .M. Al-Dabbagh	Email: adnansaffwi57@uomosul.edu.iq Email: maandabbagh @uomosul.edu.iq
8. Course Objectives	
Course Objectives	The course covers conductive heat transfer of plane wall cylinder and sphere. Also, it determines the critical thickness of insulation. Heat transfer from fins, Two-dimensional heat transfer, and unsteady state conduction. Thermal boundary layer laminar and turbulent flow, Heat transfer for fluids flowing over a flat plate, through and across pipes. Natural convection, Radiation heat transfer, shape factor, radiation heat transfer between surfaces, Heat exchangers, logarithmic mean temperature difference, NTU method, fouling factor.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. The modes of heat transfer, The thermal conductivity 2. One-dimensional steady-state conduction in the plane wall, types of insulation, and thermal resistance. 3. Radial systems, the overall heat transfer coefficient, critical thickness 4. Heat sources, Conduction –Convection Systems, the extended surface area (Fins). 5. Mathematical Analysis of Two-Dimension heat conduction. 6. Lumped – Heat capacity system, Transient Heat Flow in a semi-infinite solid, convection 7. Principle of Convection, Laminar Boundary Layer on Flat Plate, Turbulent Boundary Layer Heat Transfer. 8. Heat transfer in Laminar Tube Flow, Turbulent Flow in a Tube. 9. Empirical and Practical Relations for Forced-Convection Heat Transfer of flow through tubes, Flow Across tube Banks.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Mechanical properties of fluids, Dimensions, and unit	lectures	
2-3	4	LO#1	One-dimensional steady-state conduction	lectures	Homework#1
4-5	4	LO#1	Radial systems (cylindrical and spherical).		Quiz
6-7	4	LO#1, LO#2	Conduction with heat source (energy generation)	lectures	Homework#2
7-8	4	LO#2	Heat transfer from Extended surfaces (fins).	lectures	Exam#1
9-10	4	LO#1, LO#2	Unsteady state conduction.	lectures	
11	3	LO#1	Lumped – Heat capacity system		report
12	6	LO#2	Mathematical Analysis of Two-Dimension Heat Conduction	lectures	
13-14	2		Two-dimensional, steady-state conduction.	lecture	
15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	4 point
Quiz	12 point
Problem-Based Learning exam	4 point
1st Term Exam	10 point
2nd Term Exam	10 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	J.P.Holman, " Heat Transfer" , McGRAW.HILL INTERNATIONAL EDITION, tenth edition, 2010.
Primary references (sources):	Frank Kreith, R.M. Manglik, M.S.Bohn, "Principle of Heat transfer", CENGAGE Learning, seventh edition, 2011.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code: agwgoin**	

Course Description Form

1. Course Name:	
Kinematic Analysis	
2. Course Code:	
MEC 303	
3. Semester / Year:	
Spring /2022-2023	
4. Description Preparation Date:	
5/1/2023	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Abdulhaqq A. Hamid Email: abdulhaqqhamid@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course contributes to the following student outcomes: 1. Students shall gain clear knowledge about mechanisms and machines. 2. Students shall demonstrate the ability to draw and visualize the kinematic diagrams of actual mechanisms and their mobility. 3. Students shall demonstrate the ability to determine the position, velocities, and acceleration (both linear and angular) of various points and links in mechanisms and machines using three essential methods: Analytical, graphical, and vector methods. 4. Students can use the techniques, skills, and modern tools.
9. Teaching and Learning Strategies	
Strategy	This course will deal with kinematic analysis of mechanisms and machines. It will include motion and force transmission analysis of linkage mechanisms, open and closed-chain planar robots, and geared transmission. It will cover direct and inverse kinematics, velocity and acceleration analysis, kinematic path generation for robots, and singularities in kinematic chains. The course is expected to help students in their basic understanding and use of kinematic analysis. An Introduction to the theory of machines, definitions, basic concepts, simple mechanisms and machines. Cams: Introduction, Types of desired motion, method of analysis, and designing of cams.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Introduction to the theory of machines and review of Engineering Mechanics.	lectures	Quiz
2-3	4	LO#1	Position analysis in machines and mechanisms: solved examples, tutorial sheet #1.	lectures	Quiz + Home Work#1
4-5	4	LO#1	Velocity analysis in machines and mechanisms:	lectures	Quiz+HW#2
6-7	4	LO#1, LO#2	Acceleration analysis in machines and mechanisms: introduction, methods for determinations for accelerations.	lectures	Exam#1
7-8	4	LO#2	Methods for determination of accelerations	lectures	Homework
9-10	4	LO#1, LO#2	Solved examples and sheet #3.	lectures	Quiz
11	3	LO#1	Tooth gears: Introduction, Types of Gears, Applications, Force analysis.	lectures	Quiz
12	6	LO#2	Cams: Introduction, types, analysis, and designing of cam profiles.	lectures	Homework
13	2		Solved examples and tutorial sheet #3.	lecture	
14-15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	7.5 point
Quizzes	7.5 point
Participation	5 point
1st term Exam	10 point
2nd term Exam	10 point
Total	40 points

12. Learning and Teaching Resources

• Required textbooks (curricular books, if any): • Mechanics of Machines, (Advanced and Examples), by: J. Hannah and R. C. Stephens, all editions, 1984, 2017,	• Theory of Machines, by: R. S. Khurmi and J. K. Gupta, First-Edition 2010.
Recommended books and references (scientific journals, reports)	
Electronic References: **https://classroom.google.com** **Class code: 73dct7h**	

Course Description Form

1. Course Name:	
Compressible fluid Flow	
2. Course Code:	
MEC331	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Omer S. Alabidalkreem Email: omerphd18@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	This course reviews the fundamentals of compressible flow dynamics and general information about the speed of objects and gases. The dynamic behavior of gases and objects is included in this course. The properties of gases around the objects and inside the nozzles and ducts are taught. Different types of flow are classified and illustrated. The mathematical models of the physical systems are explained, and the dynamic behavior of the gas flow based on initial conditions is analyzed analytically. Mass conservation, momentum, and energy equations are used for fully solved examples, emphasizing real-world applications.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Understand the Mach number and its effects. 2. Recognize the impact of airfoil on the properties of flow. 3. Determine the properties of flow under different conditions. 4. Derive the equation of flow properties such as velocity, temperature, pressure, and entropy. 5. Outline the essential components of airfoils.
10. Course Structure	

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

1	2	LO#1	Basic Definitions of Compressible Flow.	lectures	Quiz
2-3	4	LO#1	Types of Compressible Flow and Sound Velocity.	lectures	Homework#1
4-5	4	LO#1	One-Dimensional Isentropic Flow. Isentropic Flow in Nozzles and Diffuser.		Quiz
6-7	4	LO#1, LO#2	Normal Shock Wave. Normal Shock Wave in Nozzles and Diffuser.	lectures	Homework#2
7-8	4	LO#2	Adiabatic Flow in Constant-Area	lectures	Quiz
9-10	4	LO#1, LO#2	Duct with Friction-Derivation of Basic Equations.	lectures	1st term exam
11	3	LO#1	Fanno Flow in constant-area Duct with Normal Shock Wave.		Homework#3
12	6	LO#2	Fanno Flow in constant-area Duct Fed by a Convergent-Divergent Nozzle.	lectures	Homework#4
13-14	2		Compressible Flow in Constant-Area Duct with Heat Transfer-Derivation of Basic Equations.	lecture	2nd term exam
15	3	LO#1, LO#2	Course review	lectures	

11. Course Evaluation

Task	Weight (Marks)
Homework	8 point
Quiz	8 point
Problem-Based Learning exam	4 point
1st term exam	10 point
2nd term exam	10 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Anderson, John David. "Modern compressible flow: with historical perspective." (No Title) (1990).
Primary references (sources):	Anderson, John. EBOOK: Fundamentals of Aerodynamics (SI units). McGraw Hill, 2011.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code:** x623gwh	

Course Description Form

1. Course Name:	
Metallurgy	
2. Course Code:	
MEC332	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
1/6/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed N. Rashid Email: Ahmed.n.rashid@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Recognizing the binary alloy systems for ferrous metals & ternary alloy systems. • To enrich students' knowledge and develop their skills in alloy steel heat treatments and engineering applications. • To understand the hardenability and surface hardening of steel. • To understand nonferrous metals and alloys and bearing metals. • To compare different types of strengthening mechanisms of metals. • Understand the failure of metals, the strengthening mechanisms, and the international specification of metals and alloys.
9. Teaching and Learning Strategies	
Strategy	This course aims to enrich the knowledge of second-level students about applied metallurgy of ferrous metal, including binary alloy systems and ternary alloy systems, ad heat treatments, and engineering applications. Thus, the primary strategy of this course is to encourage students to recognize different types of materials in real life. Also, they need to refine their thinking skills to analyze the microstructure of metals and understand their effects on the mechanical properties of metals. As a result, students will evaluate and recognize the relationship between the microstructure transformation of metals and their properties and applications. This strategy is achieved through classes, interactive discussions, different lab experiments, seminars, and by considering real applications.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1-2	6	LO#1	Binary alloy systems for ferrous metals	lectures	Quiz
3-4	6	LO#1	Ternary alloy systems (1)	lectures	Quiz
5	6	LO#1	Alloy steels: alloying elements, heat treatments, and engineering applications.		
6	6	LO#1, LO#3	Alloy steels: alloying elements, heat treatments, and engineering applications.		
7-8	6	LO#2	Hardenability and surface hardening		
9-10	6	LO#1, LO#3	Nonferrous metals and alloys (1)		
11	3	LO#1	Bearing metals		
12-13	6	LO#3	Deformation and defects of metals.		
14	3	LO#1, LO#3	International specification of metals and alloys		

11. Course Evaluation	
Task	Weight (Marks)
Homework	5 point
Quizzes	10 point
Projects	5 point
Report	5 point
Midterm Exam	15 point
Total	40 points

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"Fundamentals of material science and engineering", William.d.callister, 4th ed., John Weily & sons, 2012, USA
Primary references (sources)	Engineering metallurgy", R. A. Higgins, part I, 6th ed, London.
Recommended books and references (scientific journals, reports)	Technology of engineering materials, M. Philip & W. Bolton, BH, 2002, London.
Electronic References, Websites	

Course Description Form

1. Course Name:	
Convection and Heat Transfer Radiation	
2. Course Code:	
MEC352	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30/ 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Adnan Mohammed. Al- Saffawi Email: adnansaffwi57@uomosul.edu.iq Name: Maan Saad .M. Al-Dabbagh Email: maandabbagh @uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course covers convection and radiation modes of heat transfer. Distinguish between the modes of heat transfer and identify scenarios where each mode is predominant. Develop mathematical models to describe heat transfer processes in different systems using differential equations and boundary conditions. Explore the principles of convection, including forced and natural convection. Calculate convective heat transfer coefficients for various geometries. Develop a strong foundation in the concepts of thermal radiation, including blackbody and graybody radiation principles.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Solve practical engineering problems involving heat exchangers, thermal insulation, and cooling systems 2. Analyze experimental data using statistical methods and interpret results to enhance understanding of heat transfer phenomena. 3. Radial systems, the overall heat transfer coefficient, critical thickness 4. Explore the role of heat transfer in various mechanical systems. 5. Develop critical thinking and problem-solving skills necessary for tackling complex heat transfer problems. 6. Understand the role of numerical methods in solving heat transfer equations. 7. Principle of Convection, Laminar Boundary Layer on Flat Plate, Turbulent Boundary Layer Heat Transfer.

	8. Analyze view factors and understand their role in radiation heat transfer problems.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Convection heat transfer	lectures	
2-3	4	LO#1	Boundary layer theory.	lectures	Homework#1
4-5	4	LO#1	Forced convection over a flat plate		Quiz
6-7	4	LO#1, LO#2	Laminar and turbulent flow in the tube.	lectures	Homework#2
7-8	4	LO#2	flow across cylinders, flow across the bank.	lectures	Exam#1
9-10	4	LO#1, LO#2	Natural convection heat transfer.	lectures	
11	3	LO#1	Combined Free and Forced Convection.		report
12	6	LO#2	Types of Heat Exchanges, overall heat transfer coefficient	lectures	
13-14	2		Radiation heat transfer	lecture	
15	3	LO#1, LO#2	Radiation heat transfer between black and gray surfaces	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	4 point
Quiz	12 point
Problem-Based Learning exam	4 point
1st Term Exam	10 point
2nd Term Exam	10 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	J.P.Holman, " Heat Transfer" , McGraw.HILL INTERNATIONAL EDITION, tenth edition, 2010.
Primary references (sources):	Frank Kreith, R.M. Manglik, M.S.Bohn, "Principle of Heat transfer", CENGAGE Learning, seventh edition, 2011.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code: agwgoin**	

Course Description Form

1. Course Name:	
Introduction to Machine Design	
2. Course Code:	
MEC353	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Alaa D. Younis Email: alaayonis@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Design mechanical components and assemblies using knowledge of materials, manufacturing, and operating environment. • Explain the importance of engineering design's legal, environmental, and social aspects. • Identify the possible causes of failure in specific components or products. • Apply effectively integrated design methods to produce technical solutions to particular problems.
9. Teaching and Learning Strategies	
Strategy	The module will be taught through a combination of lectures and workshops. An active and inclusive approach engages students in the topics. The approach offers students a flexible and adaptive learning experience that can accommodate a range of options, including both on-campus and remote learning, where appropriate. Thus, the primary strategy of this course is to encourage students to recognize the principle of the design of mechanical components. Also, they need to refine their thinking skills to force analyses of structures and understand their effects on the mechanical properties of metals. This strategy is achieved through classes, interactive discussions, different lab experiments using computers, and by considering real applications.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	LO#1	Introduction to Design of Machine Elements	lectures	Quiz
3-4	6	LO#1	Design by Computer Stress analysis	lectures	Quiz
5	6	LO#1	Design for Different Types of Loading	lectures	
6	6	LO#1, LO#3	Design of belts	lectures	
7-8	6	LO#2	Design of Chains Design of Keys and Coupling	lectures	Quiz
9-10	6	LO#1, LO#3	Design of shafts (1)	lectures	
11	3	LO#1	Design and selection of bearings	lectures	
12-13	6	LO#3	Design of pressure vessels	lectures	Quiz
14	3	LO#1, LO#3	Design of case study	lectures	

11. Course Evaluation

Task	Weight (Marks)
Homework	7.5 point
Quizzes	7.5 point
Projects	5 point
Report	5 point
Midterm Exam	15 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Machine Elements in Mechanical Design, Robert L. Mott, Fourth Edition
Primary references (sources)	ASHBY, M., SHERCLIFF, H. and CEBON, D., 20 Materials. 3rd ed. Oxford: Butterworth-Heinema
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Course Description Form

1. Course Name:
MACHINES DYNAMICS
2. Course Code:
MEC 354
3. Semester / Year:
Spring /2024-2025
4. Description Preparation Date:
5/1/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total):
30 / 2
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Abdulhaqq A. Hamid Email: abdulhaqghamid@uomosul.edu.iq
8. Course Objectives

Course Objectives	This course will cover the essential theories and techniques of kinetics and dynamics analysis of machines. Balancing of rotating masses\Balancing of reciprocating masses. Clutches systems. Brakes systems. Belts, ropes, and chain drives. Gyroscopes: gyroscopes application: ships, airplanes, etc. Gyroscope motion, Gyroscope couple analysis. Turning moment diagrams and flywheels. Governors.

9. Teaching and Learning Strategies

Strategy	The course contributes to the following student outcomes: 1. Students shall gain clear knowledge about the dynamics of mechanisms and machines. 2. Students shall demonstrate a basic understanding of balancing different types of machinery. 3. Students shall demonstrate complete knowledge about wear and friction and their engineering applications in belt drives, clutches, and brakes. Also, it provides a full analysis of static and dynamic forces. 4. Students can analyze and design the mechanical governors for a machine. 5. Students shall demonstrate knowledge about crank effort and flywheel.

10. Course Structure

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

1	2	LO#1	Fast review on Engineering Mechanics.	lectures	Quiz
2-3	4	LO#1	Gyroscopes: Gyroscope couple analysis. Solved examples and tutorial sheet #1 + Quiz #1	lectures	Quiz + Home Work#1
4-5	4	LO#1	Mechanical Governors: Controlling force and stability, Sensitivity, and insensitivity of governors.	lectures	Quiz + Homework# 2
6-7	4	LO#1, LO#2	Balancing of Rotating masses: Balancing of reciprocating masses:	lectures	Exam#1
7-8	4	LO#2	Clutches systems: Solved Examples, tutorial sheet #6.	lectures	Homework
9-10	4	LO#1, LO#2	Solved examples and tutorial sheet #3.	lectures	Quiz
11	3	LO#1	Belts, ropes, and chain drives: Solved Examples.	lectures	Quiz
12	6	LO#2	Turning moment diagrams and flywheels: Solved examples.	lectures	Homework
13	2		Solved examples and tutorial sheet #3.	lecture	
14-15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	7.5 point
Quiz	7.5 point
Participation	5 point
1st term Exam	10 point
2nd term Exam	10 point
Total	40 points

12. Learning and Teaching Resources

• Required textbooks (curricular books, if any): • Mechanics of Machines, (Advanced and Examples), by: J. Hannah and R. C. Stephens, all editions, 1984, 2017,	• Theory of Machines, by: R. S. Khurmi and J. K. Gupta, First-Ed. 2010.
Primary references (sources): Mechanics of Machines, (Elementary and Examples), by Hannah and R. C. Stephens, all editions, 1984, 2017.	
Recommended books and references (scientific journals, reports)	
Electronic References: **https://classroom.google.com** **Class code: 73dct7h**	

Course Description Form

1. Course Name:	
Mechanical Engineering Laboratories	
2. Course Code:	
MEC355	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Taha Ahmed Abdullah Email: tahatahamir99g @uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course aims to enhance understanding of mechanical engineering principles by applying theoretical concepts in practical experiments and projects. It also assists students to learn to interpret results, recognize trends, and draw meaningful conclusions from the data collected during experiments. This course covers many experiments in mechanical engineering principles. It develops skills in setting up experiments, conducting tests, and collecting accurate data to ensure reliable results.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Learn how to gain knowledge by looking at reality. 2. Providing an experimental foundation for the theoretical concepts. 3. To teach how to make careful experimental observations. 4. How to think about and conclude. 5. To learn how to write a technical report which communicates scientific information clearly and concisely. 6. Promote collaboration through group projects and experiments, enhancing communication and teamwork skills. 7. Develop the ability to conduct experiments systematically and document procedures, observations, and results effectively. 8. Provide exposure to real-world applications of mechanical engineering principles through industry-relevant experiments and projects.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Introduction, Dividing Students into Groups	Lab & hands-on	report
2-3	4	LO#1	Centrifugal Force Measurement Experiment. Dynamic Balancing Experiment	Lab & hands-on	report
4-5	4	LO#1	Pelton Turbine Experiment Centrifugal Pump Performance Experiment	Lab & hands-on	report
6-7	4	LO#1, LO#2	Forced Convection from a Cylinder in Cross Flow Experiment Conduction Analogue Experiment	Lab & hands-on	report
7-8	4	LO#2	Determination of Thermal Conductivity of Metals Experiment	Lab & hands-on	report
9-10	4	LO#1, LO#2	Gyroscopic Effect Experiment The Hartnell Governor Experiment	Lab & hands-on	report
11-12	3	LO#1	Study of the Spark Ignition Engine Experiment Heat Pump Experiment	Lab & hands-on	report
13	6	LO#2	The Behavior of Two Centrifugal Pumps	Lab & hands-on	report
14	2		Re-conducting a part of the experiments for the licensed students	Lab & hands-on	report
15	3	LO#1, LO#2	Course review	lectures	Term Exam

11. Course Evaluation

Task	Weight (Marks)
Attendance	5 point
Report	15 point
Problem-Based Learning exam	5 point
1st Term Exam	10 point
2nd Term Exam	15 point
Total	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	
Primary references (sources):	
Recommended books and references (scientific journals, reports)	
Electronic References	

Course Description Form

1. Course Name:	
Turbo-Machinery	
2. Course Code:	
MEC360	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Taha Ahmed Email: Tahatahamir100@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	This course reviews the fundamentals of fluid machinery turbine, Pelton turbine, Frances's turbine, Kaplan turbine, theory of draft tube, working condition variation, specific turbine performance, turbine modeling, centrifugal pumps, pressure change in centrifugal pumps, multistage pumps, similarity of pumps.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Apply Impulse - Momentum principles and applications 2. Calculate the forces and power generated by the turbine. 3. Derive the equations of pumps. 4. To find the relationships between impulse and reaction turbine. 5. Apply dimensional analysis to solve mechanical problems. 6. Calculate the losses in the manometric head.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Introduction to the hydraulic turbine.	lectures	Quiz
2-3	4	LO#1	Impulse turbine – Pelton turbine	lectures	Homework#1
4-5	4	LO#1	Pelton turbine – solved problems		Quiz

6-7	4	LO#1, LO#2	Reaction turbine – Francis turbine	lectures	Homework#2
7-8	4	LO#2	Francis turbine, Propeller turbine, and Kaplan turbine	lectures	Quiz
9-10	4	LO#1, LO#2	Theory of draft tube working condition variation	solved problems	1st term exam
11	3	LO#1	specific turbine performance		Homework#3
12	6	LO#2	Centrifugal pumps	lectures	Homework#4
13-14	2	LO#2	Pressure change in centrifugal pumps	lecture	Homework#5
15	3	LO#1, LO#2	Course review	lectures	2nd term exam

11. Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quiz	5 point
Problem-Based Learning exam	5 point
1st term exam	10 point
2nd term exam	10 point
Final	60 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Vennard, J. K. (2011). Elementary fluid mechanics. Read Books Ltd.
Primary references (sources):	Bruce R. Munson, Donald F. Young and Theodore H. Okiishi, 2002. "Fundamentals of Fluid Mechanics"
Recommended books and references (scientific journals, reports)	Fluid Mechanics 5th edition Frank White. 1999.
Electronic References: https://classroom.google.com **Class code:** zehu5gf	

Course Description Form

1. Course Name:	
Metallic Engineering Materials	
2. Course Code:	
MEC361	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
1/6/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Anas Balood Email: anasbalod@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of students to develop their knowledge in metals, alloys, and non-metallic materials. • To develop problem-solving skills by using theories of material selection in solving any problem related to engineering materials. • To understand the properties of advanced materials such as shape memory alloys (SMA) and fusible alloys. • To learn about rubber composite materials with their properties, manufacturing processes, and applications. • To understand the behavior of ceramics and rubber and their uses in material selection. • To compare corrosion types and methods of prevention. • To know about powder metallurgy techniques in the industry. • To understand the principle of nanotechnology. • To identify the relationship between properties and material selection.
9. Teaching and Learning Strategies	

Strategy	This course aims to enrich students' knowledge of the importance of engineering materials, including metallic and non-metallic materials. Thus, the primary strategy of this course is to encourage students to recognize the applications of different materials in their lives. Also, they need to refine their thinking skills to select suitable materials for any design, analyze different applications in the industry, and make good decisions. As a result, students will learn about metals and alloys with their properties and applications. This strategy is achieved through classes, interactive discussions, and seminars.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	LO#1, LO#2	International specification of materials	lectures	Quiz
3-4	6	LO#1, LO#2	Corrosion principles.	lectures	Quiz
5	6	LO#1	Corrosion preventions.		
6	6	LO#1, LO#4	Engineering polymers (1)		
7-8	6	LO#2	Engineering elastomers		
9-10	6	LO#1, LO#4	Ceramics		
11	3	LO#1	Composite materials (1)		
12-13	6	LO#5	Selection of materials (1)		
14	3	LO#1, LO#4, LO#5	Shape memory alloys		

11.Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quizzes	5 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	15 point
Final	60 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Fundamentals of material science and engineering", William.d.callister, 4th ed., John Weily & sons, 2012, USA
Primary references (sources)	Engineering metallurgy", R. A. Higgins, part I, 6th ed, London.
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
INTRODUCTION TO COMBUSTION	
2. Course Code:	
MEC362	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed Fouad Mahmood Al-Neama Email: ahmedfalneama @uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course presents an introduction to internal combustion engines (I.C.Es). It includes the calculation of air-fuel ratio from combustion equations, exhaust gases (volumetric and gravimetric analysis, wet and dry analysis), Fuel types (gaseous, liquid, and solid fuel), 1st law of thermodynamics applied to combustion processes for calculation of the amount heat released during combustion, adiabatic flame temperature calculation, 2nd law of thermodynamic applied to combustion processes, dissociation and chemical equilibrium, description of combustion phenomena in both spark ignition engine and compression ignition engines, type of flames, pre-mixed flame, diffusion flame. Also, the stability of systems and vibration-measuring instruments are described.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Understand the combustion process (definitions and types). 2. Recognize various types of combustion. 3. Write the actual combustion equation, calculate the air-fuel and equivalence ratios, and analyze combustion products. 4. Calculate the heat of the reaction due to combustion. 5. Demonstrate complete knowledge about the 1st and 2nd laws of thermodynamics applied to combustion processes. 6. Understand the dissociation process and why it occurred. 7. Applying the performance analysis in the design of the combustion chamber.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	LO#1	Introduction to internal combustion engines	lectures	
2-3	4	LO#1	A mixture of ideal gases, Energy properties of an ideal mixture	lectures	Homework#1
4-5	4	LO#1	Combustion and calculation of air-fuel ratio, equivalence ratio		Quiz
6-7	4	LO#1, LO#2	Application of the first law of thermodynamic	lectures	Homework#2
7-8	4	LO#2	Estimating the heat released from combustion	lectures	Solved problems
9-10	4	LO#1, LO#2	Application of the second law of thermodynamic	lectures	
11-12	3	LO#1	Combustion phenomena in both spark ignition engines and compression ignition engines		report
13	6	LO#2	Measurement of burning velocity	lectures	
14	2		Define normal and abnormal combustion	lecture	
15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation	
Task	Weight (Marks)
Homework	7.5 point
Quiz	7.5 point
Problem-Based Learning exam	5 point
1st Term Exam	10 point
2nd Term Exam	10 point
Final	60 points

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any):	Internal Combustion Engines: Applied Thermosciences, Allan T. Kirkpatrick, John Wiley & Sons Ltd. 4th edition, 2021.
Primary references (sources):	Principles of combustion, Kenneth Kuan-yun Kuo, John Wiley & Sons, Inc. 2nd edition, 2005.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code: ag25gohn**	

Course Description Form

1. Course Name:	
Medium Manufacturing Processes	
2. Course Code:	
MEC363	
3. Semester / Year:	
Spring /2022-2023	
4. Description Preparation Date:	
1/6/2023	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 / 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Mohammed Najeeb Abdullah Email: moh_77@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Analyze and evaluate various manufacturing processes' capabilities, limitations, and application suitability. • To explore the working principles, tooling requirements, process parameters, and applications of advanced machining processes • To recognize different welding techniques, joint design considerations, and the factors influencing the selection of joining processes. • To gain knowledge of the working principles, tooling requirements, process parameters, and forming process applications. • Integrating computer-aided design (CAD) and manufacturing (CAM) systems. • Generating tool paths, optimizing machining processes, and simulating manufacturing operations using CAM software.
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module will be encouraging students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	LO#1, LO#2	Metal Forming types, Material behavior, and Flow stress at different temperatures.	lectures	Quiz
3-4	6	LO#1, LO#2	Rolling Operation, Analysis of Flat Rolling	lectures	Quiz
5	6	LO#1	Forging, Open –Die Forging, Extrusion Process, Analysis of Extrusion		
6	6	LO#1, LO#3	Wires and bars drawing. Analysis of the drawing process		
7-8	6	LO#2	Welding processes: Arc, Submerged Arc, Plasma Arc Welding		
9-10	6	LO#1, LO#3	Sand casting, Shell molding, Investment casting Permanent mold casting, Centrifugal casting		
11	3	LO#1	Die design and casting defects.		
12-13	6	LO#3	NC and CNC machines Applications of CNC, CAD/CAM		
14	3	LO#1, LO#3, LO#5	Non-traditional machining (1)		

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quizzes	5 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	25 point
Final	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mikell P.Groover. "FUNDAMENTALS OF MODERN MANUFACTURING _ MATERIAL PROCESSES AND SYSTEM". John Wiley and Sous. 2002.
Primary references (sources)	B.H. Amsted, Philip F. Ostward and Myron L.' MANUFACTURING PROCESSES' Begman Jhon Willey Sons-Inc 2005.
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Solar Energy	
2. Course Code:	
MEC364	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mahmoud Usamah Jasim Email: Mahmood14@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	In this course, students learn the basics of solar energy engineering. These factors affect and determine the direction of solar radiation at any location, date, and time of the day. It also provides the basics of solar radiation and calculating the intensity of solar radiation on a given surface, in addition to the basic applications of solar energy.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Define solar angles, which define the direction of incoming solar radiation. 2. Perform the calculation required to determine the direction of the sun's rays at any given location, date, and time. 3. Know the solar radiation spectrum and its main divisions and the percentage of energy included in each division, 4. Define the beam and diffused solar radiation. 5. Calculate the solar radiation intensity received on a tilted surface. 6. Classify the applications of solar energy 7. Classify solar collectors and the working principle of each class. 8. Classify and describe the solar water heating systems. 9. Classify and describe the solar air heating systems 10. Understand the working principle of photovoltaic solar cells (PV cells)
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	The sun; relative relation between the sun and earth (solar angles).	lectures	Homework#1
2-3	4	LO#1	Calculation of shaded area on a given surface	lectures	Homework#2
4-5	4	LO#1	Solving tutorial sheets 1 & 2.		solving examples
6-7	4	LO#1, LO#2	Solar spectrum and solar constant	lectures	Exam#1
7-8	4	LO#2	Solar radiation	lectures	Homework#3
9-10	4	LO#1, LO#2	Solar collectors, classification, working principle	lectures	Homework#4
11	3	LO#1	Solving tutorial sheets 3 & 4.		solving examples
12	6	LO#2	Optical and thermal analysis of concentrating parabolic	lectures	Homework#5
13	2		Describing Solar water heating systems	lecture	
14-15	3	LO#1, LO#2	Describing Integrated Combined Power Generation Plant.	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quiz	10 point
Participation	5 point
Problem-Based Learning exam	5 point
2nd term Exam	10 point
Final	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Solar engineering of the thermal process, Duffie John A. & Beckman Williams A., WILEY, 4th ed., 2013
Primary references (sources):	Solar energy engineering: processes a systems. Kalogirou Soteris A., Elsevier I 1st ed, 2009.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com/c/NTk1MjkxMTkwMDg **Class code: ffhn7da**	

Course Description Form

1. Course Name:	
Introduction to composite materials	
2. Course Code:	
ME465	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Omar Jumaah Email: omarjumaah@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course covers topics intended to introduce various aspects of composite materials. The design and mechanical behavior of composite materials will be presented. The course will cover many topics, such as reinforcement and matrix materials, manufacturing methods, composite applications, etc.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Understand the concept of composite materials. 2. Recognize the classification of composite materials. 3. Different methods of manufacturing composite materials. 4. Understand the mechanical behavior of the matrix under the reinforcement phase. 5. Illustrate the effect of the interface phase between the matrix and reinforcement fibers. 6. Understand the wettability and its impact on the performance of composite materials.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	LO#1	Briefly review the principles of composite materials.	lectures	
2-3	4	LO#1	Classifications of Composite Materials. Methods of Fabrication of Composite Materials.	lectures	Homework#1
4-5	4	LO#1	Composite Response to Mechanical and Thermal Stresses		Quiz
6-7	4	LO#1, LO#2	Wettability and Interfacial Bonding.	lectures	Homework#2
7-8	4	LO#2	Stiffness and Strength of Unidirectional Composites	lectures	Quiz
9-10	4	LO#1, LO#2	Failure Criteria of Composite Materials	lectures	Homework#3
11	3	LO#1	Advances in composite materials		report
12	6	LO#2	Properties Estimation of Different Composite Materials	lectures	
13-14	2		Strengthening Mechanisms of Composite Materials	lecture	
15	3	LO#1, LO#2	Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quiz	10 point
Report	5 point
Problem-Based Learning exam	5 point
Term Exam	10 point
Final	60 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Mechanics of Composite materials, Jones, Robert M., 1999, Taylor & Francis Group, LLC, USA
Primary references (sources):	Introduction to Composite Materi Design, Ever J., Barbero, 2018, Taylo Francis Group, LLC, USA.
Recommended books and references (scientific journals, reports)	
Electronic References: https://classroom.google.com **Class code: hhgn7ja**	

Course Description Form

1. Course Name:	
Elasticity	
2. Course Code:	
MEC 423	
3. Semester / Year:	
Autumn /2024	
4. Description Preparation Date:	
5/9/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa Dahham Email: alaayonis@uomosul.edu.iq	
8. Course Objectives	
Course Objectiv	This course is a general introduction to the theory of elasticity. This is the single most important branch of solid mechanics. It encompasses the mechanical behavior of an enormous variety of engineering and natural materials and provides a template for the formulation of more advanced models of complex material behavior, such as plasticity, growth and thermo-mechanics. The first half of the course is devoted to the nonlinear theory, including the basic concept of elasticity, its relationship to work and energy, the concepts of frame invariance and material symmetry, simple solutions that facilitate correlation of theory with experiment, applications to polymers and bio-tissues, and the concept of elastic stability. The second half of the course emphasizes the linear theory, derived by systematically linearizing the general theory. This is useful in the small-deformation regime characterizing the majority of engineering applications, including wave propagation and vibrations. A wide variety of sophisticated analytical methods are applicable to the linear theory and their coverage constitutes the balance of the course.

9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 8. Apply principles of elasticity theory to estimate stresses and strains in isotropic and non isotropic materials using a tensorial approach. 9. Formulate and solve boundary value problems in solid continua using stress and displacement based solution Strategies. 10. Formulate and solve planar problems using Airy stress function in rectangular and polar co-ordinates 11. Solve specific three-dimensional problems like torsion, bending of non-circular prismatic bar, membrane analogy and simple plate bending

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	LO#1	Basic concepts– Body force– Surface traction - generalised Hooke's Law	lectures	Quiz
2-3	6	LO#1	Stresses and strains–Three dimensional stresses and strains–analysis	lectures	Homework# 1
4	3	LO#1	**Tutorial sheet No.1**	lectures	Quiz
5	3	LO#1, LO#2	transformation equations of 3D stresses & strains– Lame's constant-, , bulk modulus, Shear modulus	lectures	Quiz
6-7	6	LO#2	principal stresses &strains – Mohr's circle	lectures	Quiz
8	3	LO#1, LO#2	States of stresses & strain	lectures	Homework# 2

9	3	LO#1	Equilibrium equations- Compatibility Conditions	lectures	Quiz
10-11	6	LO#2	Plane stress and plain strain- stress–strain relations– equilibrium equations in Cartesian and polar co-ordinates	lectures	
12	3		**Tutorial sheet No.2**	lecture	Quiz
13	3	LO#1, LO#2	**1st term Examination**		Exam#1
14-15	6		Airy's stress function- Saint Venant's principle.	lecture	

11. Course Evaluation

Task	Weight (Marks)
Homework	10 point
Quiz	10 point
Report	5 point
Problem-Based Learning exam	5 point
Term Exam	10 point
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	**Theory of Elasticity and Plasticity**, H.Jane Helena, Eastrn Economy Eidition
Primary references (sources):	**Theory of Elasticity**, S. Tomoshenko and J.N. Goodier, The Maple Press Company, 1951
Recommended books and references (scientific journals, reports...)	Online
Electronic References: https://classroom.google.com Class code: wylu4yi	

coordination
Department of Media and Government
Communication at the College of Engineering