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

2026

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
Description Preparation Date: 2026\4\26
File Completion Date: 2026\4\26

Signature:
Head of Department Name:
Dr.Abdulhaq A. Hamid
Date: 26/4/2026

Signature:
Scientific Associate Name:
Dr. Ayman T. Hamid
Date: 26-4-2026

جامعة الموصل كلية الهندسة قسم الهندسة الميكانيكية

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Assistant Professor Rana B. Abdulrahman
Date:
Signature: 2026/4/26

Approval of the Dean
Dr. Omar M. Hamdoon
University of Mosul College of Engineering Dean Office

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.

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	18	13.11%	Basic course
	0	0	0%	Elective course
College Requirements	8	34	13.11%	Basic course
	0	0	% 0	Elective course
Department Requirements	45	224	73.77%	Basic course
	0	0	0%	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
First level / Bologna Process 2025 -2026	ME101	Engineering Mechanics-Statics I	4	
	ME102	Mathematics I	4	
	ME103	Manufacturing Processes I	3	3
	ME104	Engineering Drawing	4	3
	ME105	Physics 1	4	
	UOM1031	Computer 1	3	
	UOM1011	Arabic Language1	2	
	ME151	Engineering Mechanics-Statics II	4	
	ME152	Mathematics II	4	
	ME153	Physics 2	3	2
	ME154	Introduction to Electrical Engineering	3	2
	ME155	Energy and Sustainability	4	
	UOM1021	English language I	2	
	UOM1040	Democracy and Human Rights	2	
Second leval / Bologna Process 2025 -2026	ME201	Engineering Mechanics-Dynamics	5	
	ME202	Fluid Mechanics I	5	
	ME203	Thermodynamics I	2	
	ME204	Mechanics of Materials I	4	
	ME205	Physics 3	2	2
	ME206	Mechanical Drawing		3
	UOM2050	Crimes of the Baath regime in Iraq	2	
	UOM2022	English Language 2	2	
	ME251	Fluid Mechanics II	4	
	ME252	Thermodynamics II	4	
	ME253	Mechanics of Materials II	4	
	ME254	Mathematics III	6	
	ME256	Mechanical Engineering Laboratory I		3
	UOM2032	Computer 2	2	1
	UOM2012	Arabic Language 2	2	

Third Leval/ Bologna Process 2025 -2026	ME301	Theory of Machines	6	
	ME302	Conductive Heat Transfer	3	
	ME303	Manufacturing Processes II	2	3
	ME304	Combustion and Pollution	3	
	ME305	Gas Dynamics	3	
	ME306	Non-Destructive Testing	2	
	ME307	Mechanical Considerations	2	
	ME351	Machine Element Design	7	
	ME352	Convective and Radiative Heat Transfer	3	
	ME353	Numerical Analysis	5	
	ME354	Engineering Management and Economics	4	
	ME355	Internal Combustion Engines	3	
	ME356	Mechanical Engineering Laboratory II		3
	ME357	Applied Chemistry	2	
	ME358	Engineering Project ,Design and Planning	2	
Fourth Leval / semester Process 2025 -2026 /	ME401	Design of Machines System I	2	
	ME402	Control & Measurements I	2	
	ME403	Air Conditioning	3	
	ME404	Introduction to Vibrations	2	
	ME405	Engineering Materials - 1	2	
	ME406	Power Plants I	2	
	ME407	Electric Machines	2	2
	ME408	Graduation Project I	2	
	ME451	Design of Machines System II	2	
	ME452	Control & Measurements II	2	
	ME453	Refrigeration	3	
	ME454	Vibration	2	
	ME455	Engineering Materials - 2	2	
	ME456	Power Plants II	2	
	ME459	Laboratories III		3
	ME460	Computer Aided Thermal System Design	1	2
	ME458	Graduation Project II	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 financial, environmental, and societal considerations.	**C3**- The ability to recognize the ongoing necessity of professional knowledge growth and how to find, evaluate, accumulate, and apply it correctly.
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			5	
Assist. Professor	Mech. Engineering	Thermal Power			1	
Assist. Professor	Mech. Engineering	Production & Metallurgy			5	
Lecturer	Mech. Engineering	Thermal Power			5	
Lecturer	Mech. Engineering	Applied Mechanics			5	
Lecturer	Mech. Engineering	Production & Metallurgy			5	
Lecturer	Mech. Engineering	Materials Engineering			1	
Assist. Lecturer	Mech. Engineering	Thermal Power			1	
Assist. Lecturer	Mech. Engineering	Production & Metallurgy			4	

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\ Bologna 2026–2025	ME101	Engineering Mechanics-Statics I	Basic	✓				✓						✓			
	ME102	Mathematics I	Basic	✓			✓										
	ME103	Manufacturing Processes I	Basic	✓											✓		
	ME104	Engineering Drawing	Basic		✓				✓								
	ME105	Physics 1	Basic	✓			✓	✓	✓					✓			
	UOM1031	Computer 1	Basic						✓	✓							
	UOM1011	Arabic Language1	Basic			✓											
	ME151	Engineering Mechanics-Statics II	Basic	✓				✓						✓			
	ME152	Mathematics II	Basic	✓			✓	✓						✓			
	ME153	Physics 2	Basic	✓	✓			✓	✓				✓				
	ME154	Introduction to Electrical Engineering	Basic	✓				✓						✓			
	ME155	Energy and Sustainability	Basic	✓				✓				✓					
	UOM1021	English language I	Basic			✓				✓			✓				
	UOM1040	Democracy and Human Rights	Basic			✓							✓				

Second level\ Bologna 2026 –2025	ME201	Engineering Mechanics-Dynamics	**Basic**	✓				✓						✓		
	ME202	Fluid Mechanics I	**Basic**	✓				✓						✓		
	ME203	Thermodynamics I	**Basic**	✓					✓							
	ME204	Mechanics of Materials I	**Basic**		✓			✓						✓		
	ME205	Physics 3	**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	Mathematics III	**Basic**	✓			✓							✓		
	ME256	Mechanical Engineering Laboratory I	**Basic**	✓				✓		✓						
	UOM2032	Computer 2	**Basic**				✓				✓		✓			
	UOM2012	Arabic Language 2	**Basic**			✓							✓			

Third level\ Bologna 2026–2025	ME301	Theory of Machines	**Basic**	✓							✓				
	ME302	Conductive Heat Transfer	**Basic**	✓						✓					✓
	ME303	Manufacturing Processes II	**Basic**	✓				✓				✓			
	ME304	Combustion and Pollution	**Basic**	✓					✓				✓		
	ME305	Gas Dynamics	**Basic**	✓	✓										
	ME306	Non-Destructive Testing	**Basic**	✓				✓				✓			
	ME307	Mechanical Considerations	**Basic**	✓				✓						✓	
	ME351	Design of Machine Elements	**Basic**	✓	✓			✓							
	ME352	Convective and Radiative Heat Transfer	**Basic**	✓						✓					✓
	ME353	Numerical Analysis	**Basic**				✓				✓			✓	
	ME354	Engineering Management and Economics	**Basic**			✓			✓					✓	
	ME355	Internal Combustion Engines	**Basic**	✓					✓				✓		
	ME356	Mechanical Engineering Laboratory II	**Basic**	✓						✓					✓
	ME357	Applied Chemistry	**Basic**	✓				✓				✓			
	ME358	Engineering Project ,Design and Planning	**Basic**	✓				✓				✓			

Forth level \ semester 2026–2025	ME401	Design of Machines System I	**Basic**		✓			✓						✓	
	ME402	Control & Measurements I	**Basic**	✓				✓							✓
	ME403	Air Conditioning	**Basic**	✓	✓						✓	✓			
	ME404	Introduction to Vibrations	**Basic**	✓							✓				✓
	ME405	Engineering Materials - 1	**Basic**								✓			✓	
	ME406	Power Plants I	**Basic**		✓				✓				✓		
	ME407	Electric Machines	**Basic**	✓		✓		✓						✓	
	ME408	Graduation Project I	**Basic**		✓			✓							
	ME451	Design of Machines System II	**Basic**		✓			✓						✓	
	ME452	Control & Measurements II	**Basic**	✓				✓						✓	
	ME453	Refrigeration	**Basic**	✓	✓						✓	✓			
	ME454	Vibration	**Basic**		✓			✓							
	ME455	Engineering Materials - 2	**Basic**								✓			✓	
	ME456	Power Plants II	**Basic**		✓				✓				✓		
	ME459	Laboratories III	**Basic**					✓	✓	✓					✓
	ME460	Computer Aided Thermal System Design	**Basic**		✓			✓						✓	
	ME458	Graduation Project II	**Basic**		✓			✓							

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

Course Description Form

First level

1. Course Name:	
Mechanical Engineering -Static I	
2. Course Code:	
ME101	
3. Semester / Year:	
Fall 2025-2026	
4. Description Preparation Date:	
15/9/2025	
5. Available Attendance Forms:	
Presence /online	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 Units /60 Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Ghaidaa Ibrahen Husaen. Email: ghaidaa.alsarraj2019@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of first-year 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.
9. Teaching and Learning Strategies	
Strategy	This course focuses on an interactive learning approach**,** engaging students in group discussions and hands-on in-class activities**,** in addition to using computers and presentation software to apply concepts. This methodology aims to develop students' critical thinking skills and enhance their ability to apply knowledge in determining the acting forces**,** particularly in the field of engineering design
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Knowledge(1A) Skills(1B) Professional and Ethical Values(3C)	Introduction to statics + Vector operations (addition, product).	**lectures**	• In-Class Activities • H.W. • Exams
2	4		. Cartesian force and position vectors.		
3	4		Force system in 2D.		
4	4		Force system in 2D + Recitation.		
5	4		. Addition of a system of coplanar Force.		
6	4		. Moment, couples, and resultant of forces + Recitation.		
7	4		Moment, couples, and resultant of forces + Recitation.		
8	4		Moment of a Force about a Specified Axis. Force system in 3D.		
9	4		Rectangular components of forces in		

			3D + Recitation.		
10	4		Resultant of forces in 3D + Recitation System Isolation F.B D		
11	4				
12	4				
13	4		Midterm exam		
14	4		Equations and Conditions of Equilibrium + Recitation.		
15	4		A course review.		

11.Course Evaluation			
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc			
Quizzes	30	Report	2
Assignments	4	Midterm Exam	10
seminar	4	Final Exam	50

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
Main references (sources)	Hibbeler, RC, “Engineering Mechanics Statics”, 14th edition, 2016
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:	
Mathematics I	
2. Course Code:	
ME102	
3. Semester / Year:	
Fall /2025-2026	
4. Description Preparation Date:	
01 /12 /2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 4	
7. Course administrator's name (mention all, if more than one name)	
Dr Laith Mohammed Jasim / Email: jasiml68@uomosul.edu.iq Tara nashwan Mohammed/ email: tara.nashwan@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Understand the basic concepts of functions and their domains. • Analyze and interpret different types of functions graphically and algebraically. • Understand the concept of limits and continuity. • Apply the rules and techniques of differentiation. • Use derivatives to solve practical problems in science and engineering (e.g., rates of change, optimization). • Understand the concept of Linear Algebraic Equation, Matrix and vectors. • Develop logical reasoning and problem-solving skills.
9. Teaching and Learning Strategies	
Strate	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 engineering problems that involve sampling activities students find interesting.
10.Course Structure	

Week	*Hours*	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	A\1 A\4	Function definition and types, Domain and Range, Graphs of functions, Classification of equations (Algebraic and Differential).	lectures	Homework
2	4		linear and non-linear function, vertical line test, Piecewise functions, Even and odd function, symmetric function, Shifting a graph of a function.	lectures	Homework
3	4		Power functions, Polynomials functions, Rational functions, Algebraic functions, Exponential functions Logarithmic functions, and trigonometric functions.	lectures	Quiz
4	4		Limits and Continuity: The Limit of a Function, the functions that haven't limits, the theories (1, 2, 3 to 6) of limit, Eliminating Common Factors from Zero Denominators.	lectures	Classwork
5	4		The Sandwich Theorem, sin (theta)theta theorem, Limits Involving Infinity, Asymptot.	lectures	Homework
6	4		Continuous Functions: Continuity at a Point; Continuity Test, Properties of Continuous Functions, Inverse Functions and Continuity, composites of continuous functions, Limits of Continuous Functions.	lectures	Quiz
7	4		Derivatives: mathematical definition of the derivative, Tangents and the Derivative at	lectures	Homework

			a Point, Defining Slopes and Tangent Lines, The Derivative of a function, The Slope of Lines, Differentiation Rules, Integer Powers, Multiples, Sums, and Differences.		
8	4		Velocity, Speed, and Other Rate of Change such as acceleration and jerk; Derivatives of Trigonometric Functions and other Basic Functions, The Chain Rule, Integer Powers of Differentiable Functions;	lectures	Midterm Exam. Report
9	4		Implicit Differentiation and Fractional Powers, Lenses, Tangents, and Normal Lines, Using Implicit Differentiation to Find Derivatives of Higher Order, Fractional Powers of Differentiable Functions, Linear Approximations and Differentials.	lectures	Classwork
10	4		Applications of Derivatives: Related Rates of Change, Maxima, Minima, and the Mean Value Theorem, The First Derivative Theorem, The Mean Value Theorem, Curve Sketching with y' and y", Points of Inflection; Graphing with y' and y".	lectures	Homework
11	4		Matrices: Basic Definitions, Addition, Subtraction and Multiplication	lectures	Quiz
12	4		Transposition, Determinants and Inverse of a Matrix, System of Linear Algebraic Equation.	lectures	Homework
13	4		Gramer's rule and Matrix inverse.	lectures	Classwork
14	4		Gauss elimination and Gauss-Jordan method.	lectures	Homework

15	4		Principles of vectors in two dimensions, vector in space, and properties of vectors	lectures	Homework

11.Course Evaluation	
Task	Weight (Marks)
Homework	10 %
Quizzes	10 %
Report	10 %
Classwork	10 %
Midterm Exam	10 %
Final Exam	50 %
Total	100 %

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	George B. Thomas, Jr., Calculus, Thirteenth Edition, Pearson Education, Inc., 2014.
Primary references (sources)	Richard Courant and Fritz John, Introduction to Calculus and Analysis, Vol. 1, Springer, 1999.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:	
Manufacturing Processes I	
2. Course Code:	
ME103	
3. Semester / Year:	
Autumn /2025-2026	
4. Description Preparation Date:	
20/09/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
90 hours / 6 ECTS	
7. Course administrator's name (mention all, if more than one name)	
Name: Qays Hazim Ismael Email: qayshazim1970@uomosul.edu.iq	
8. Course Objectives	
9. Teaching and Learning Strategies	
Strateg	Helping the student to learn the principles of manufacturing processes, starting with learning about the mechanical properties of raw materials and how to obtain these materials, and then learning about the methods of forming these materials and using them in various engineering applications.

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	6		Engineering materials / physical properties. Workshop lab.	Lectures and Experimental	Exam and Report

2	6	Knowledge (1A) Values (4C)	Mechanical properties. Workshop lab.	Lectures and Experimental	Exam and Report
3	6		Ferrous metals. Workshop lab.	Lectures and Experimental	Exam and Report
4	6		Blast furnace for the production of cast iron. Workshop lab.	Lectures and Experimental	Exam and Report
5	6		Production of steel (part 1). Workshop lab.	Lectures and Experimental	Exam and Report
6	6		First Exam.	Lectures and Experimental	Exam and Report
7	6		Production of steel (part 2). Workshop lab	Lectures and Experimental	Exam and Report
8	6		Production of non-ferrous metals. Workshop lab.	Lectures and Experimental	Exam and Report
9	6		Die casting. Workshop lab.	Lectures and Experimental	Exam and Report
10	6		Plastic forming of metals (Rolling). Workshop lab.	Lectures and Experimental	Exam and Report
11	6		Plastic forming of metals (Extrusion). Workshop lab.	Lectures and Experimental	Exam and Report
12	6		Mid Term Exam	Lectures and Experimental	Exam and Report
13	6		Plastic forming of metals (Drawing). Workshop lab	Lectures and Experimental	Exam and Report
14	6		Welding (part 1) Workshop lab.	Lectures and Experimental	Exam and Report
15	6		Welding (part 2) Workshop lab.	Lectures and Experimental	Exam and Report

11.Course Evaluation	
Task	Weight (Marks)
Quizzes	15 point
Work shop	10 point
Report	10 point
Seminar	5 point
Midterm Exam	10 point
Final Exam	50 point
Total	100 points

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Manufacturing Processes
Main references (sources)	• Mikell P.Groover , Fundamental of Modern Manufacturing Materials, Processes , and Systems, John Willey and Sons, INC, 2010. .
Recommended books and references (scientific journals, reports...)	N/O
Electronic References, Websites	N/O

1. Course Name:	
Engineering Drawing	
2. Course Code:	
ME104	
3. Semester / Year:	
first / 2026	
4. Description Preparation Date:	
20/4/2026	
5. Available Attendance Forms:	
Lecture, **Tutorial**, **Practical**	
6. Number of Credit Hours (Total) / Number of Units (Total)	
90/ 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Ghazi Mohammed Kamil+ Mr. Nooraldeen saleh Khidher Email: aligm@uomosul.edu.iq , nooralelln2017@uomosul.edu.iq	
8. Course Objectives	
• Understand and apply the basic idea of central projection theory. Apply the principle of conservation of mechanical energy to solve simple problems in mechanics. • Explanation of the central and parallel projection theory to understand the projection process. • Explanation of the isometric theory to understand the isometric drawing process. •	• Understand and apply the basics of drawing types of lines. • Define, explain and apply engineering drawing operations. • Understand the basics of drawing an ogee curves
9. Teaching and Learning Strategies	
Strategy	Students will be able to: 1. Drawing engineering shapes manually and clearly, 2. Develop a solid understanding of the basic principles of engineering drawing, including: 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.

	3. Use the graphic results of a specific design and convert them into engineering drawings. 4.Determine the strategies to be used and the assumptions to be made. 5.Use both manual and computer approaches in drawing figures. 6. Develop the ability to use engineering tools flexibly and creatively. 7. Develop an integrated understanding of the AutoCAD module. 8. Developing their ability to communicate scientific ideas. 9.Identify what they do not understand, and ask specific questions to gain understanding. 10.Develop expertise in experimental methodologies.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	2/ a 2/b	Fundamentals of Engineering Drawing & Point Projection	Lecture, demonstration, board drawing	Quiz, drawing exercise submission
2	6		Lines and Their Properties	Lecture, practical line drawing, worksheets	Practical test, homework assignment
3,4&5	18		Geometric Constructions, Arcs, Lamina & Dimensioning	Workshop, step-by-step drawing practice	Mid-term project, dimensioning exercise
6,7,8&9	24		Multiview Projection (Orthographic Projection)	Lectures, guided drawing, CAD or manual drafting	Assignment, practical exam (drawing views)
10,11&12	18		Isometric Drawing	Demonstration, hands-on isometric sketching	Isometric drawing submission, class test
13,14&15	18		Missing View Projection	Problem-solving, individual practice, peer review	Final project, comprehensive drawing exam

11.Course Evaluation			
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc			
Quizzes	15	Report	5
Assignments	10	Midterm Exam	10
Practical	10	Final Exam	50

12.Learning and Teaching Resources	
Required textbooks (curricular books, any)	➢ "NGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Thirteen Edition, By: THOMAS E.FRENCH, CHARLES .VIERCK, ROBERT J.FOSTER ➢ ENGINEERING DRAWING AND AUTO CAD", By:RAMZY SYHOOD HAMIED ➢ TECHNICAL GRAPHICS COMMUNCATION", THIRD EDITION, Gary R.
Main references (sources)	➢ NGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Thirteen Edition, By: THOMAS E.FRENCH, CHARLES .VIERCK, ROBERT J.FOSTER
Recommended books and references (scientific journals, reports...)	➢ William D.CallisterJr.&David D.Rethwisch.(2010)"Material Science and Engineering An introduction", eightEdition. ➢ D. R. Askeland (2011) “The Scinence and engineering of materials". Course Outcomes
Electronic References, Websites	➢ ENGINEERING DRAWING Any edition

Course Description Form

1. Course Name:	
Physics I	
2. Course Code:	
ME105	
3. Semester / Year:	
Fall /2025-2026	
4. Description Preparation Date:	
09/11/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
75 Hours / 5 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: SUHA HASHIM AHMED Email: suabaumu@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Students will be able to: 1. Write clear physical and mathematical arguments including effective use of physical equations. 2. Develop a solid understanding of the fundamental principles of physics, including: a. a firm conceptual grasp of the central principles of physics, b. an ability to work with the concepts mathematically, and c. a functional understanding of how these ideas play out in the real world. 3. Use graphs and diagrams to convey results. 4. Decide on strategies to be used and assumptions that need to be made. 5. Use both algebraic and geometric approaches in problem-solving. 6. Develop a flexible and creative problem-solving ability. 7. Develop an integrated understanding of the unity of physics. 8. Translate physical descriptions into mathematical equations, and conversely, explain the physical meaning of mathematical results. 9. Examine intermediate results or other quantities that could be used to ensure a solution is physically reasonable. 10. Develop their ability to communicate ideas of science.

	11. Identify what they don't understand, and ask specific questions in order to gain understanding. Develop an expertise in experimental methodologies.

9. Teaching and Learning Strategies

Strategy	The primary strategy for delivering this course will be to encourage students to actively participate in solving exercises while refining and expanding their critical thinking skills. This will be achieved through lectures and interactive tutorials that focus on discussing concepts and applying them to various theoretical problems, in addition to motivating students to ask questions and engage in scientific discussions aimed at deepening their understanding of the course material and developing their analytical and reasoning skills.

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	Knowledge (1A,4A) Skills (1B,2B) Professional and Ethical Values (3C)	Introduction to physics; Standards of length, mass and time; Scalar and Vector quantities; Kinematics; Position, Displacement and Distance; Speed, Velocity and Acceleration.	lectures	H-W
2	4		Forces and motion; Mass and gravity force; Newton's three laws of motion.	lectures	Quiz +H-W
3	4		Spring forces and Hooke's law; Friction forces; Uniform circular motion; Work.	lectures	Quiz +H-W
4	4		Kinetic and Potential Energy; The work-kinetic energy theorem; Conservation of total mechanical energy; Power.	lectures	Quiz +H-W
5	4		Linear momentum; Momentum and kinetic energy; Rate of change of linear momentum and Newton's laws; Law of conservation of linear momentum; Impulse.	lectures	H-W
6	4		Simple Harmonic Motion; Universal gravitation; Newton's	lectures	H-W

			law of universal gravitation; Free-fall acceleration and the gravitational force; and Solve problems using Newton's law of universal gravitation and calculate the gravitation for different locations.		
7	4		Fluid mechanics; Pressure and density of fluid at different depth; Hydrostatic pressure; Pascal's principle and the operation of a hydraulic lift.	lectures	H-W
8	4		Buoyant forces and Archimedes's principle; the equation of continuity for fluids; and the Bernoulli's equation.	lectures	QUIZ
9	4				
10	4		Atoms Structure; Atomic Energy Level; and Materials Used in Electronics.	lectures	
11	4		Conduction in Metals, Semiconductors, and Insulators; Intrinsic and Extrinsic Semiconductors; N-Type and P-Type Semiconductor; The PN Junction.	lectures	
12	4		Diodes and Transistors.	lectures	
13	4		Current and Voltage; electrical circuit; and Ohm's Law.	lectures	
14	4		Power and Energy; Parallel and Series Networks.	lectures	
15	4		Kirchhoff's Law.	lectures	

11.Course Evaluation

Task	Weight (Marks)	Task	Weight (Marks)
Homework	5 point	Discussions and Seminars	5 point
Quizzes	25 point	Midterm Exam	10 point
Projects	5 point	Final	50 points
Total	100 % points		

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1- Physics for scientists and engineers: An interactive approach. Robert Hawkes, Javed Iqbal, Firas Mansour, Marina Milner-Bolotin and Peter Williams. 2nd edition, 2019. 2- Fundamentals of Physics. David Halliday, Robert Resnick and Jearl Walker. 10th Edition, 2014. 3- Engineering Mechanics: Dynamics - Volume 2. J.L. Meriam, L.G. Kraige and J. N. Bolton. 8th edition, 2015.
Primary references (sources)	1- Electronic Devices. Thomas L. Floyd. 9th Edition, 2012. 2- Physics for Scientists and Engineers with modern physics. Raymond A. Serway and John W. Jewett. 9th edition, 2014.
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Computer I	
2. Course Code:	
UOM1031	
3. Semester / Year:	
Fall /2025-2026	
4. Description Preparation Date:	
22/9/2025	
5. Available Attendance Forms:	
In-person attendance (presence) and Online attendance (virtual participation).	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 hours / 3 ECTS	
7. Course administrator's name (mention all, if more than one name)	
Name: Muyassar Edris Ismaeel Email: muyassar.alhasso@uomosul.edu.iq Name: Zenaa Moyaser Abid Email: zenaamsc13@uomosul.edu.	
8. Course Objectives	
Course Objectis	• Identify computer components and their basic functions. • Use the operating system and user interface to manage files and run programs. • Create and edit documents using Microsoft Word and spreadsheets using Microsoft Excel. • Prepare effective presentations using Microsoft PowerPoint. • Use the internet, web browsers, and email for communication and information search.
9. Teaching and Learning Strategies	
Strateg	□ Practical learning: Direct hands-on application using Microsoft Word and Microsoft Excel. □ Cooperative learning: Group work to complete tasks using Microsoft PowerPoint.

	□ Self-directed learning: Conducting online research tasks using Google Chrome. □ Continuous assessment: Monitoring performance through short practical activities.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Skills B\2 B\3	Introduction to Computers	lectures	Quiz
2-3	6		Computer Components	lectures	Quiz
4-5	6		Operating Systems and Graphical User Interface		
6-7	6		Word Processing – Microsoft Word		
8-9	6		Spreadsheets – Microsoft Excel		
10-11	6		Presentation Software – Microsoft PowerPoint		
12-13	6		Introduction to the Internet and Web Browsers		
14	3		Communication and Email		
15	3		Computer Troubleshooting		

11.Course Evaluation

Task	Weight (Marks)
Assignments	5 point
Quizzes	10 point
Lab.	20 point
Report	5 point
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	N/A
Primary references (sources)	Computer Literacy A Comprehensive Guide to IC3 by: Connie Morrison, Dolores Wells, Lisa Ruffolo
Recommended books and references (scientific journals, reports...)	IC3: Internet and Computing Core Certificat Computing Fundamentals Study Guide
Electronic References, Websites	Google Classroom

Course Description Form

1. Course Name:
Arabic Language1
2. Course Code:
UOM1011
3. Semester / Year:
Second Semester / 2025-2026
4. Description Preparation Date:
April 20, 2025
5. Available Attendance Forms:
Weekly theoretical lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ruqayah Hamid Ali Email: (Email: ruqayah.h.a@uomosul.edu.iq)
8. Course Objectives
To help students protect their speech and writing from grammatical and spelling errors, and to master the correct writing skills necessary for daily life.
9. Teaching and Learning Strategies

Strategy	e course encourages collaboration between the teacher and learner ough continuous interaction, including discussions, questioning, l board exercises. It relies on organized design to achieve desired formance changes using various tools and methods adapted to ferent teaching conditions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Origins of Grammar (Ilm al-Nahw) and its founders	Quran verses and Hadith	
2	2		Parts of speech and types of definite nouns	Cosmic phenomena applications	

3	2		Subject and Predicate (Mubtada & Khabar)	Classical Arabic poetry	
4	2		Declinability (I'rab), Invariability (Binaa'), and Verb types	Classroom examples	
5	2		Original and subsidiary grammatical signs	Daily life examples	
6	2		Dual, Sound Masculine Plural, and their attachments	Quiz / Historical examples	
7	2	Knowledge (3A)	Dual and Sound Masculine Plural (Continued)	Student-provided examples	
8	2		Sound Feminine Plural and its attachments	Household/daily life applications	
9	2		The Five Nouns	Quranic applications	
10	2		The Five Verbs and their scales	Nouns, verbs, particles, and pronouns	
11	2		Hamzat al-Wasl (Connecting Hamza), Hamzat al-Qat' (Cutting Hamza), and the Medial and Final Hamza.	Daily and professional life examples	
12	2		Defective Verbs	University environment examples	
13	2		Particles resembling verbs	Poetry and Quranic applications	
14	2		Rules of Taa' Marbuta and	Arabic prose applications	

			Mabsuta (the tied and open 'T') and where each occurs, the Lunar and Solar Lam, and distinguishing between the letters Dad (ض) and Dha (ظ)		
15	2		Punctuation marks, Classical and Free verse poetry	Prose and poetry applications	

11.Course Evaluation			
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc			
Quizzes		Report	
Assignments		Midterm Exam	
Practical		Final Exam	

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

Course Description Form

1. Course Name:	
Engineering Mechanics-Static II	
2. Course Code:	
ME151	
3. Semester / Year:	
Second Semester – 2026	
4. Description Preparation Date:	
17/4/2026	
5. Available Attendance Forms:	
Face-to-Face ,Online , Practical Exercises	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 Credit Units/ 60 Hours	
7. Course administrator's name (mention all, if more than one name)	
Name: Ghaidaa Ibrahem Husain alsarraj Email: ghaidaa.alsarraj2019@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To develop the capacity of first-year 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.
9. Teaching and Learning Strategies	
Strategy	This course focuses on an interactive learning approach**,** engaging students in group discussions and hands-on in-class activities**,** in addition to using computers and presentation software to apply concepts. This methodology aims to develop students' critical thinking skills and enhance their ability to apply knowledge in determining the acting forces**,** particularly in the field of engineering design.

10. Course Structure

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

1	4	Knowledge(1A) Skills(1B) Professional and Ethical Values(3C)	Trusses	**lectures**	1-In Class Activities 2-H.W. 3-Exams
2	4		joint method		
3	4		section method		
4	4		frame and machines.	**lectures**	1-In Class Activities 2-H.W. 3-Exams
5	4		frame and machine analysis		
6	4		distributed forces		
7	4		center of mass and center of gravity		
8	4		center of mass and center of gravity		
9	4		Friction		
10	4		phenomenon of dry friction		
11	4		Midterm Exam		
12	4		Moment of inertia		
13	4		moment of inertia of areas and masses		
14	4		moment of inertia of areas and masses		
15	4		Comprehensive review		

11.Course Evaluation			
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc			
Quizzes	30	Report	2
Assignments	4	Midterm Exam	10
seminar	4	Final Exam	50

12.Learning and Teaching Resources	
Required textbooks (curricular books, any)	Meriam, James L., and L. Glenn Kraige, “Engineering mechanics: statics”, John Wiley & Sons, 2012.
Main references (sources)	Hibbeler, RC, “Engineering Mechanics Statics”, 14th edition, 2016.
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 /2025-2026	
4. Description Preparation Date:	
8 /3 /2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 hours / 4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: SUHA HASHIM AHMED Email: suabaumu@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Understand the concept of the definite and indefinite integral as the inverse process of differentiation and as a method for calculating accumulated quantities and areas. • Develop proficiency in standard integration techniques including substitution, integration by parts, and partial fraction decomposition. • Interpret definite integrals in terms of geometry and physical applications such as area under a curve and total accumulated change. • Apply integration to solve real-world engineering problems such as finding areas, volumes of solids of revolution, arc lengths, surface areas, and work done by variable forces. • Use integral calculus to model and analyze physical systems including fluid pressure. • Strengthen students' analytical skills and ability to communicate mathematical reasoning in both technical and practical contexts.
9. Teaching and Learning Strategies	

In order to create an interactive and enriching learning environment, PowerPoint presentations and various multimedia tools are extensively used in the classroom to visually support the theoretical content and keep students engaged. Complex concepts are clarified through step-by-step problem solving on the classroom board, allowing for better comprehension and student participation. In addition, weekly tutorials and extra sessions are organized to establish a stronger connection between instructors and students, offering opportunities for direct guidance, personalized feedback, and open discussions to reinforce learning

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	Knowledge (1A,4A) Skills(1B) Professional and Ethical Values(3C)	• Area and Estimating with Finite Sums. • The Definite Integral. • The Fundamental Theorem of Calculus. • Indefinite Integrals and the Substitution Method. • Definite Integral Substitutions and the Area between Curves.	lectures	Homework
3-4	8		**Applications of Definite Integrals:** Volume using Cross section Volumes Using Disk Method Volumes Using Washer Method	lectures	Quiz
4-5	8		• Volumes Using Cylindrical Shells. • Arc Length. • Areas of Surfaces of Revolution.	lectures	Quiz + Homework
6-7	8		Work and Fluid Forces	lectures	Exam

7-8	8		Integrals and Transcendental Functions: Natural Logarithm Inverse of ln x and the Number e The General Exponential Function (ax) Logarithm with base a $(Logax)$	lectures	Homework
9-10	8		Hyperbolic Functions Inverse of Hyperbolic Functions	lectures	Quiz
11	4		Techniques of Integration Using Basic Integration Formulas. Integration by Parts Definite Trigonometric Integrals	lectures	Quiz
12-13	8		Trigonometric Substitutions Integration of Rational Functions by Partial Fractions	lectures	Homework
14	4		Integration of Rational Functions by Partial Fractions	lectures	Quiz + Homework
15	4		Course review	lectures	Exam
16			Final exam		

11.Course Evaluation

Task	Weight (Marks)	Task	Weight (Marks)
Homework	5 point	Report	5 point
Quizzes	25 point	1st term Exam	10 point
Participation	5 point	Final Exam	50 point

12.Learning and Teaching Resources

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

Course Description Form

1. Course Name:
Physics II
2. Course Code:
ME153
3. Semester / Year:
Spring / 2025-2026
4. Description Preparation Date:
29/2/2026
5. Available Attendance Forms:
Attendance in classrooms and online attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
75 / 6
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer :Ahmed Nafie Rashed Email: ahmed.n.rashid@uomosul.edu.iq Name Lecturer : Qays Hazim Ismaeel Email : qayshazim1970@uomosul.edu.iq
8. Course Objectives
-The ability to recognize, identify, define, formulate and solve engineering problems by applying the principles of science, engineering and mathematics in the student's understanding and comprehension of binary alloy systems and their mechanical properties. -The ability to produce engineering designs that meet the required needs within certain constraints by applying both analysis and synthesis in the design process by developing the student's skills to understand different types of alloys and their mechanical properties with engineering applications. -The ability to create and carry out appropriate measurements and tests while ensuring quality, analyzing and interpreting the results, and using engineering judgment to reach conclusions by enriching the student's scientific knowledge to understand and comprehend create thermal equilibrium diagrams, cooling curves, and everything related to linking mechanical properties with these diagrams.

-The ability to use standard tools and techniques to conduct and design practical experiments and analyze and interpret data accurately and correctly by conducting laboratory experiments necessary for the approach to understanding and understanding different alloys such as brasses.

-Ability to recognize ethical and professional responsibilities in engineering issues and make informed judgments while considering the consequences in financial, environmental and societal considerations around the world.

- Commitment to the foundations of professionalism and respect for the principles of privacy and maintaining confidentiality, including communication and report writing skills, along with a thorough understanding of economic, legal, health, social, and security considerations. This includes studying and comprehending the types of failures that occur in mechanical parts and how to write scientific reports.

- Understanding thermal equilibrium diagrams for binary alloys, their mechanical properties, and methods for testing these properties according to international standards. Upon completion of this curriculum, students will be able to select the appropriate material for various industrial applications.

9. Teaching and Learning Strategies

- Lectures
- Homework
- Lab
- Exams
- Reports

10. Course Structure

Week	*Hours*	*Required Learning Outcomes*	*Unit or subject name*	*Learning method*	*Evaluation method*
1&2	10	Knowledge (A1, A2) Skills (B1, B2)	The crystal structure of materials, the Miller index, and its various applications.	Theoretical and practical	• Daily, monthly,

3&4	10	Values (C2).	Engineering materials, their classification, and mechanical properties		and end-of-year exams. • Homework •Reports
5	5		Mechanical tests.		
6	5		Solidification and cooling curves of metal		
7	5		Binary alloy system and thermal equilibrium diagram		
8	5		Thermal equilibrium diagram for copper/nickel alloy and its applications		
9	5		Thermal equilibrium diagram for Lead/tin alloy and its applications		
10	5		Thermal equilibrium diagram for Lead/ antimony alloy and its applications		
11& 12	10		Steel: Types, Mechanical Properties, and Applications		
13	5		Cast iron : Types, Mechanical Properties, and Applications		
14,15	10		Heat treatment of steel		

11.Course Evaluation

Quizzes	10pt	Practical	10pt
Attendance	2pt	Monthly Exams	10pt
Home works	3pt	Mid term Exam	10pt
Reports	5pt	Final Exam	50pt

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	---
Main references (sources)	Engineering metallurgy", R. A. Higgins, part I, 6th ed.,2002, London.
Recommended books and references (scientific journals, reports...)	-"Fundamentals of material science a engineering", William.d.callister, 4 ed., John weily & sons, 2012, U.S.A

Course Description Form

1. Course Name:
Introduction to Electrical Engineering
2. Course Code:
ME154
3. Semester / Year:
Spring semester / 2025-2026
4. Description Preparation Date:
March first, 2026
5. Available Attendance Forms:
BIS
6. Number of Credit Hours (Total) / Number of Units (Total)
75/6
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
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		Standard international units and introduction to basic components	**Lecture**	

Week 2	5	Knowledge (A1) Skills (B1) Values (C3).	Resistance and conductivity, Ohm 's law,.	**Lecture**	
Week 3	5		Kirchhoff's laws	**Lecture**	**Assignments**
Week 4	5		Loop analysis	**Lecture**	
Week 5	5		Nodal analysis	**Lecture**	**Quizzes**
Week 6	5		Thevenin's theorem	**Lecture**	
Week 7	5		Norten's theorem	**Lecture**	**Assignments**
Week 8	5		DC circuit analysis examples	**Lecture**	
Week 9	5		Alternating current circuits	**Lecture**	**Report**
Week 10	5		Complex numbers &polar representation	**Lecture**	
Week 11	5		Power triangle	**Lecture**	**Quizzes**
Week 12	5		p.f. correction	**Lecture**	**Midterm Exam**
Week 13	5		Three phase circuits	**Lecture**	
Week 14	5		Material 's electric	**Lecture**	**Assignments**
Week 15	5		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:	
Energy and Sustianability	
2. Course Code:	
ME155	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
1/3/2026	
5. Available Attendance Forms:	
Attendance in classrooms and online participation	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Azzam Mohammed Email: Ali.Alkhabbaz@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Understanding the fundamental principles of the field of energy and sustainability, and their importance in modern society. Identifying various energy sources, including fossil fuels, nuclear energy, and renewable energy such as solar, wind, and geothermal energy. Analyzing the environmental, economic, and social impacts of energy production and consumption. Promoting awareness of the importance of sustainable practices in the use of energy resources to preserve the environment. Developing the skills and knowledge necessary to engage in fields such as environmental consulting, energy management, and sustainability-related policymaking.
9. Teaching and Learning Strategies	
Strategy	The teaching strategy for the Introduction to Sustainable Engineering course is based on a blend of modern instructional approaches that integrate both theoretical and practical aspects to enhance students' understanding of fundamental concepts in energy and sustainability. The course content is delivered through interactive lectures that

	encourage dialogue and discussion, alongside real-world case studies that reflect the challenges and opportunities within the energy sector. Multimedia tools, such as videos and simulations, are utilized to simplify technical concepts and capture students' interest. Workshops and group work sessions are also organized to develop research, analytical, and critical thinking skills. Project-based learning further strengthens students' ability to design practical and sustainable solutions to energy-related problems. Students are encouraged to engage in self-directed learning through the provision of additional resources and references. Continuous assessment is implemented through quizzes and presentations to monitor students' progress and motivate high performance. These strategies aim to prepare graduates who can effectively contribute to environmental consulting, energy management, and sustainable policymaking, thereby supporting sustainable development and benefiting society.

10.Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	4	A\1 B\1 C\1	Introducing students to the concept of energy and its various forms	Lecture	Quiz
2	4		Introducing students to the concept of energy and its various forms	Lecture	Quiz+Homework
3	4		Introducing students to the concept of energy and its various forms	Lecture	Quiz
4	4		A statement outlining the environmental and health impacts of using carbon-emitting energy sources	Lecture	Quiz+Homework
5	4		Fundamentals and Principles of Solar Energy	Lecture	Quiz
6	4		Conversion of solar energy into thermal energy	Lecture	Seminar
7	4		Conversion of solar energy into electrical energy	Lecture	Quiz+Homework

8	4		Fundamentals and Principles of Wind Energy	Lecture	Quiz+Report
9	4		Fundamentals and Principles of Geothermal Energy	Lecture	Report
10	4		Fundamentals and Principles of Wave Energy and Geothermal Energy	Lecture	Seminar
11	4		Introducing students to the concept of sustainability	Lecture	Quiz
12	4		Introducing students to the concept of sustainability	Lecture	Quiz+Homework
13	4		Analysis of the Performance Characteristics of Energy Storage Systems	Lecture	Quiz+Homework
14	4		Analysis of the Performance Characteristics of Energy Storage Systems	Lecture	Quiz+Homework
15	4		Mid exam	Exam	Exam

11.Course Evaluation

Task	Weight (Marks)
Reports	5 points
Quizzes	20 points
Seminars	5 points
Homeworks	10 points
Midterm Exam	10 point
Total	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Primary references (sources)	Ibrahim Dincer, Azzam Abu-Rayash, Energy Sustainability, Elsevier (2019) MEHMET KANOĞLU, YUNUS A. ÇENGEL, and JOHN M. CIMBALA, Fundamentals and Applications of Renewable Energy , Mc Gra Hill (2020)
	Robert Bennett Dunlap, Sustainable Energy, Second Edition (2017)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Google Classroom

Course Description Form

1. Course Name:	
English Language I	
2. Course Code:	
UOM1021	
3. Semester / Year:	
Second Semester 2025-2026	
4. Description Preparation Date:	
18/3/2026	
5. Available Attendance Forms:	
In-person and Online	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours/ 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Lecturer. Amina Ahmed Shawqi Email: amina.ahmed@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	**- To develop students' fundamental English language skills, particularly in reading, writing, and basic grammar, with a focus on the present simple tense and auxiliary verbs.** **-To expand students' general and academic vocabulary and enable them to construct correct sentences in various contexts.** **-To enable students to use English effectively in everyday and academic situations, while linking language learning to the mechanical engineering field through simplified texts and exercises.**
9. Teaching and Learning Strategies	
Strategy	**- Interactive and task-based learning: by engaging students in classroom discussions and implementing activities and exercises to apply grammar and vocabulary.** **- Collaborative and practice-based learning: through group work and continuous practice using modern teaching tools, while linking language content to the engineering field.**

10. Course Structure

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

1	2	To enable students to understand the course objectives and its basic requirements.	Introduction	Knowledge (A3) Skills (B3) Values (C2).	Assignments
2	2	To enable students to identify the uses of the Present Simple and construct correct sentences.	Parts of Speech: Present Simple (Verb)		
3	2	To enable students to read texts and understand the main idea and key details.	Reading Passage: Professions		
4	2	To enable students to distinguish the uses of the Past Simple and use it in simple sentences.	Parts of Speech: Past Simple (Verb)		Quiz
5	2	To enable students to recognize different types of nouns and use them correctly in sentences.	Parts of Speech: Nouns		Assignments
6	2	To enable students to use prepositions correctly in sentences.	Parts of Speech: Prepositions		
7	2	To enable students to	Parts of Speech: Adverbs		

		identify adverbs and use them to describe actions.			
8	2	To assess the extent to which the intended learning outcomes have been achieved.	Midterm Examination		
9	2	To enable students to differentiate between the use of since and for in sentences.	Parts of Speech: Since and For		Assignments
10	2	To enable students to use linking words (e.g., and, but, because) to connect sentences.	Parts of Speech: Linking Words		
11	2	To enable students to distinguish between a / an / the and use them correctly.	Parts of Speech: Articles (a / an / the)		
12	2	To enable students to write a simple email using correct language.	Email Writing		
13	2	To develop students' reading and comprehension skills for new texts.	External Reading Passage		Report Writing

14	2	To enable students to understand spoken texts and convert them into simple written form.	Listening and Writing		Assignments
15	2	To enhance students' email writing skills with greater clarity and accuracy.	Email Writing		

11.Course Evaluation			
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc			
Quizzes	20	Report	5
Assignments	10	Midterm Exam	10
Practical	5	Final Exam	50

12.Learning and Teaching Resources	
Required textbooks (curricular books, any)	NEW HEADWAY INTERMEDIATE
Main references (sources)	ENGLISH GRAMMAR IN USE
Recommended books and references (scientific journals, reports...)	New HEADWAY Academic Skills
Electronic References, Websites	https://www.udemy.com/course/english-for-engineers/

Course Description Form

1. Course Name:
Democracy and Human Rights
2. Course Code:
UOM1040
3. Semester / Year:
second semester- Academic year 2025- 2026
4. Description Preparation Date:
1\3\2026
5. Available Attendance Forms:
in-person
6. Number of Credit Hours (Total) / Number of Units (Total)H:
2/30
7. Course administrator's name (mention all, if more than one name)
Name: Hiba Mahdi Younis Email: hiba_alsofy@uomosul.edu.iq
8. Course Objectives
Course Objectives aims to build student awareness Familiarize them with the concept of human rights their historical development and the most important international document such as the universal Declaration of human Rights .
9. Teaching and Learning Strategies

Strategy	Transforming the student from apassive recipient into an Active participant linking legal texts to real-life and particical Awareness regarding issues of rights and freedoms.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Definition of Human Rights and Their Sources		
2	2		The Historical Development of Human Rights		
3	2		National human rights mechanisms		
4	2		The concept of the international bill of rights		
5	2		Women's , Childrens , and minority rights in international instruments		

6	2	3-A 2-C .	National mechanisms and procedures for implementing specific or group rights	Delivering lectures and engaging in discussions with students	Exams and activities in task performance
7	2		Combating gross violations of Human rights		
8	2		International mechanisms for the protection of human rights		
9	2		Historical concepts of the emergence of democracy		
10	2		Types of democracy and their development in contemporary contexts		
11	2		Separation of powers and principles of democratic governance		
12	2		Allocated for the midterm exam		
13	2		Elections as a mechanism of democracy		
14	2		Digital transformation in democratic practice		
15	2		The democratic experience in Iraq after 2003		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

Quizzes	10	Report	10
Assignments	10	Midterm Exam	10
Practical	10	Final Exam	50

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Human Rights and Democracy
Main references (sources)	The course curriculum approved by the Ministry of Higher Education and Scientific Research for the first stage in Iraqi universities
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	

Course Description Form

Second level

1. Course Name:
Engineering Mechanics DYNAMICS
2. Course Code:
ME201
3. Semester / Year:
Fall Semester/ 2026
4. Description Preparation Date:
Sept. 2025
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
75/7
7. Course administrator's name (mention all, if more than one name)
Bakr Noori Alhasan bakralhasan@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Describe the linear and curved motion of a single particle using the fundamental concepts of displacement, velocity, and acceleration, and distinguish between different coordinate systems used in kinematic analysis (such as Cartesian, polar, and arc length coordinates). • Apply mathematical relationships that connect motion variables to solve problems related to particle motion, and develop the ability to graphically represent motion and analyze the relationships between different quantities. • Apply Newton's second law directly to particles moving under the influence of external forces by constructing and analyzing free-body diagrams to accurately determine the acting forces, or indirectly by formulating equations involving the concepts of work, kinetic energy, potential energy, as well as linear and angular impulse and momentum. • Analyze the planar motion of rigid bodies by classifying it into translational, rotational, and general motion, and use geometric and physical relationships to determine the velocity and acceleration of different points on the body. • Understand the application of linear and angular velocity and acceleration in describing the motion of bodies through the concept of relative velocity or acceleration.

9. Teaching and Learning Strategies

Lectures
Tutorials
Quizzes
Class works
Home works
Reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	10	A/1 B/1 C/3	Introduction Kinematics of Particles/Rectilinear Motion	Lectures and Tutorials	Quiz
3-4-5	15		Plane Curvilinear Motion/Rectangular, Polar, and Normal and Tangential Coordinates	Lectures and Tutorials	Quiz
6	5		Relative Motion	Lectures and Tutorials	Homework
7	5		Kinetics of Particles/Direct Applications of Newton's 2nd Law/Rectilinear and Curvilinear Coordinates	Lectures and Tutorials	Homework
8-9	10		Work energy and Potential Energy Concept	Lectures and Tutorials	
10-11	10		Impulse and Momentum, linear and Angular	Lectures and Tutorials	Quiz
12	5		Kinematics of Rigid Bodies, Rotation	Lectures and Tutorials	
13-14	10		Relative Velocity and Acceleration	Lectures and Tutorials	

15	5		Appendix: Mass Moment of Inertia	Lectures and Tutorials	
16	5		Final Exam		

11. Course Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	3, 8	LO #1
	Home Work	2	6% (6)		
	Class Work	1	6% (6)	2,6	LO#1
	Report	1	8% (8)	13	LO#1
Summative assessment	**Midterm Exam**	1hr	10% (10)	10	LO#1
	Final Exam	3hr	50% (50)	16	LO#1
Total assessment			100% (100 Marks)		

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name:	
Fluid Mechanics I	
2. Course Code:	
ME202	
3. Semester / Year:	
FALL /2025	
4. Description Preparation Date:	
8/10/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Ataalah Hussain Jassim Email: ataalah.jasim@uomosul.edu.iq	
8. Course Objectives	
Course Objective	**Understand Fluid Properties:** Define and study the physical characteristics of fluids such as density, viscosity, surface tension, and vapor pressure. **Analyze Fluid Statics (Hydrostatics):** Study pressure distribution in static fluids and calculate hydrostatic forces acting on submerged plane and curved surfaces. **Apply Buoyancy and Stability Principles:** Understand Archimedes' principle and analyze the stability of submerged and floating bodies. **Master Pressure Measurement:** Utilize manometers and various pressure-measuring devices to analyze simple hydraulic systems. **Study Fluid Kinematics:** Distinguish between flow types (steady, unsteady, uniform, non-uniform) and understand streamlines and flow rates. **Apply Continuity and Bernoulli Equations:** Use the principles of conservation of mass and energy to analyze ideal fluid motion in pipes and conduits. **Develop Engineering Problem-Solving Skills:** Gain the ability to simplify complex physical problems and apply appropriate mathematical equations to solve them.

9. Teaching and Learning Strategies

Strategy	• **Quizzes:** To ensure regular monitoring and consistent understanding of fundamental concepts. • **Homework:** To enhance the student's ability to tackle lengthy and complex computational engineering problems. • **Reports:** To improve the ability to explain engineering results and develop technical communication skills.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	A/1, B/1,C/3	Introduction to Fluid Mechanics and Fluid Properties (Density, Viscosity).	Lectures	Quiz
3-4	8		Fluid Pressure and Pressure Measurement Devices (Manometers).	Lectures	Homework
5-6	8		Hydrostatic Forces on Submerged Surfaces (Plane and Curved).	Lectures	Quiz
7	4		Archimedes' Principle, Buoyancy, and Stability of Bodies.	Lectures	-
8-9	8		Fluid Kinematics (Motion Description, Streamlines).	Lectures	Report
10-12	12		Continuity Equation and Bernoulli's Equation with Applications.	Lectures	Quiz
13-14	8		Flow Rate Measurement (Venturi, Orifice) and Momentum Conservation.	Lectures	Homework
15	4		General Review and Comprehensive Problem Solving.	Lectures	-

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quizzes	20 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	10 point
Final	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.

Course Description Form

1. Course Name:		
Thermodynamics I		
2. Course Code:		
ME 203		
3. Semester / Year:		
Autumn / 2025-2026		
4. Description Preparation Date:		
19/4/2026		
5. Available Attendance Forms:		
In-person and Online		
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. Ammar Younis Ibrahim Email: drammar2020@uomosul.edu.iq		
8. Course Objectives		
Course Objectives		• Define basic concepts including systems, surroundings, properties, processes, and thermal equilibrium. • Understand and use property tables for pure substances like steam and gases. • Apply the First Law of Thermodynamics to closed and open systems (energy balance). • Analyze heat and work as energy transfer mechanisms in engineering systems. • Develop logical problem-solving skills for thermodynamic analysis.
9. Teaching and Learning Strategies		
Strategy		The instructional strategy encourages active student participation in exercises designed to enhance critical thinking. This is achieved through formal lectures, interactive tutorials, and the analysis of practical engineering problems using steam and gas tables.

10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A\1 B\2	Introduction: Thermodynamic Systems, States, and Equilibrium.	Lectures	Homework
2	2		Zeroth Law of Thermodynamics, Pressure measurement, and Temperature scales.	lectures	Midterm Exam
3	2		Properties of Pure Substances: Phase-change processes and Saturation tables.	Lectures	Classwork
4	2		Superheated Vapor, Compressed Liquid, Ideal Gas Equation of State.	Lectures	-
5	2		Energy Transfer by Heat, Work, and Mass. First Law for Closed Systems.	Lectures	Quiz
6	2		Specific Heats (Cp, Cv), Internal Energy, and Enthalpy changes for liquids and solids.	Lectures	Homework
7	2		First Law for Open Systems (Control Volumes): Conservation of Mass.	Lectures	Classwork
8	2		Steady-Flow Energy Balance and Flow Work.	lectures	-
9	2		Steady-Flow Engineering Devices: Nozzles and Diffusers.	Lectures	Homework
10	2		Engineering Devices: Turbines, Compressors, and Pumps.	Lectures	Homework
11	2		Heat Exchangers, Mixing Chambers, and Throttling Valves.	lectures	Midterm Exam
12	2		Second Law of Thermodynamics: Heat Engines, Thermal Efficiency, Refrigerators.	Lectures	Classwork
13	2		Coefficient of Performance (COP), Carnot Cycle, and Reversed Carnot Cycle.	Lectures	-

14	2		Thermodynamic Review of Processes and Systems.	Lectures	Quiz
15	2		Comprehensive Problem Solving and Course Revision.	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

	Power Plant Engineering, P.K. Nag, McGraw Hill, 2008
	• Thermodynamics: An Engineering Approach, Yunus A. Cengel & Michael A. Boles, 5th Ed.
	• Boiler Operation Engineering: Questions and Answers, P. Chattopadhyay 2nd Ed.
	• Power Plant System Design, Li W., Priddy P., Wiley, 1985

Course Description Form

1. Course Name:	
Mechanics of materials-I	
2. Course Code:	
MEC204	
3. Semester / Year:	
Autumn /2025-2026	
4. Description Preparation Date:	
1/10/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 4	
7. Course administrator's name (mention all, if more than one name)	
Lecturer: Asst. Prof. Dr. Anas Obeed Balod Email: anasbalod@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Mechanics of materials (Strength of Materials) is a branch of applied mechanics that deals with the behaviour of solid bodies subjected to various types of loading and give the ability to calculate stresses, strains, shear stresses, shear strains, deformations, ... etc of objects under external loadings, as well as give the ability to increase the knowledge of strength of materials on engineering design and their applications.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: 1. Understand stress and strain in mechanical parts. 2. Classifying the types of stresses happening in machine by using mathematical formula for stresses. 3. Understand the basic concepts of mechanical properties for all materials. 4. Learning about the thermal effect on mechanical parts using thermal strain formula. 5. Understand the basic concepts of combined bar. 6. Recognize the basic concepts of torsion in circular shafts and bars. 7. Learning about how to draw the bending moment diagram and shear force diagram.
10. Course Structure	

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

1	4	A2 B1 C3	Introduction– Strength of Materials.	lectures	
2-3	8		Simple Stresses and Strains. Thermal Stresses.	lectures	Homework#1
4-5	8		Shear stress and shear strain; Allowable Working Stress.		Quiz
6-7	8		Compound bar subjected to external load; Equivalent or combined modulus.	lectures	Homework#2
7-8	8		Compound bar subjected to temperature change; Problems.	lectures	Quiz
9-10	8		Shearing Force and Bending Moment Diagrams	lectures	
11-12	8		Point of Contraflexure; Relationship between S.F. and B.M. and intensity of loading.		report
13-14	8		Torsion	lectures	
15	4		Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quiz	20 point
Problem-Based Learning exam	5 point
Mid Term Exam	10 point
Final Exam	50 point
Total	100 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	E. J. Hearn. "Mechanics of Materials.
Primary references (sources):	R. C. Hibbeler. "Strength of Materials.
Recommended books and references (scientific journals, reports)	Beer "Mechanics of Materials.
Electronic References: https://classroom.google.com **Class code:**	https://classroom.google.com p77tg5c4

Course Description Form

1. Course Name:
Phsics3
2. Course Code:
ME205
3. Semester / Year:
Fall / 2025
4. Description Preparation Date:
19/9/2025
5. Available Attendance Forms:
Attendance in classrooms and online attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
60 / 5
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer :Ahmed Saadoon Abdalaziz Email: Ahmed.Saadoon@uomosul.edu.iq
8. Course Objectives
• To develop the capacity students to recognize types of Binary alloy systems & Ternary alloy metallic systems . • To develop skills and understanding the Alloy steels(types and applications). • To enrich students' knowledge and develop their skills in nonequilibrium heat treatments of steels, hardenability and surface hardening of steels. • To understand nonferrous metals and alloys (brasses and bearing metals). • To understand the types of failure occurs in mechanical parts. • To understand the international specification of metals and alloys. • According to above points students will be capable to select the suitable alloy for an industrial application.
9. Teaching and Learning Strategies
• Lectures • Homework • Lab • Exams • Reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 & 2	8	1/A 1/B 1/C	Binary alloy systems.	Theoretical and practical	• Daily, monthly, and end-of-year exams. • Homework •Reports
3 & 4	8		Ternary alloy systems.		
5	4		Alloy steels: alloying elements.		
6	4		Alloy steels: Classification of alloy steels		
7	4		Alloy steels: Engineering applications.		
8	4		Non equilibrium heat treatment.		
9	4		Hardenability.		
10	4		Surface hardening of steels.		
11 & 12	8		Nonferrous alloys.		
13	14		Failure of metals .		
14 ,15	8		International specifications of alloys.		

11. Course Evaluation

Quizzes	10pt	Practical	10pt
Attendance	2pt	Monthly Exams	10pt
Home works	3pt	Mid term Exam	10pt
Reports	5pt	Final Exam	50pt

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name:	
Mechanical Drawing	
2. Course Code:	
MEC206	
3. Semester / Year:	
Autumn /2025-2026	
4. Description Preparation Date:	
20/4/2026	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
4 / 45	
7. Course administrator's name (mention all, if more than one name)	
Name: Ali Ghazi Mohammed Kamil Email: aligm@uomosul.edu.iq	
8. Course Objectives	
Course Objectiv	• Learn how to draw mechanical parts with accurate dimensions and scales. • Ability to read and understand engineering plans and drawings. • Understanding how drawings are transformed into actual parts in workshops. • Adherence to international drawing standards such as lines, symbols, and dimensions. • Improving three-dimensional visualization and shape analysis skills.
9. Teaching and Learning Strategies	
Strategy	Teaching and learning strategies are defined as a set of methods and plans adopted by instructors to organize the learning process, contributing to the achievement of educational objectives and the development of students' cognitive and skill-based abilities. These strategies focus on making the student the center of the educational process by actively engaging them in classroom and practical activities, thus fostering deep understanding rather than rote memorization. The importance of these strategies lies in developing thinking and engineering analysis skills, linking theoretical aspects to practical application, and enhancing students' ability to accurately read and understand mechanical drawings.

	Among the most prominent of these strategies are: • Problem-based learning: such as giving the student an incomplete drawing and asking them to complete or analyze it. • Hands-on learning: through creating drawings using manual tools or engineering software. • Discussion and dialogue: to exchange ideas about correct drawing metods and address errors.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	(A2), (B2) (B4),, (C2)	Installation Methods	lectures	Quiz
2-3-4	9		Connecting Rotating Parts	lectures	Quiz
5-6	6		Bearings of Metal Rod	lectures	Quiz + Homework
7-8-9	9		Mechanical Machine Parts	lectures	Exam
10–11	6		Gears	lectures	Homework
12–13	6		Tolerance	lectures	Quiz
14–15	12		Welding	lectures	Quiz

11. Course Evaluation

Task	Weight (Marks)
Report	10%
Quizzes	20%
Homework	10%
Midterm Exam	10%
Final Exam	50%
Total	100%

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. Machine drawing, R.K.DHAWAN. 2008
Electronic References, Websites	

Course Description Form

1. Course Name:
Crimes of the Baath regime in Iraq
2. Course Code:
UOM2050
3. Semester/Year:
2026-2025
4. Description Preparation Date:
2025-12-4
5. Available Attendance Forms:
Individual group
6. Number of Credit Hours(Total)/Number of Units(Total)
2\30
7. Course administrator's name (mention all, if more than one name)
Name:Shatha chachan Hameed Email: Shatha. Hameed@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Educating students about the crimes committed by the Baath regime in Iraq …… • Guiding students to familiarize themselves With crimes…… • Educating students about the seriousness of crimes……

9. Teaching and Learning Strategies
Through the prescribed book
10. Course Structure

Week	Hours	Required Learning	Unit or Subject Name	Learning Method	Evaluation Method

		Outcomes			
First	2	A\3 c\2	The concept crimes and their types	View Sfe minutes a contribution	Written lect
sec ond	2		Types of trinational crimes Political crime	=	=
	2		Exam Sociai	=	=
third	2		Crime		=
fourth	2		The crime of	=	
fifth			suppressing the Shaaban		
sixth			uprising		=
			psychologial	=	=
	2		crimes of the baath	=	=
Seventh	2		regime	=	
Eighth			of disrupting Friday prayers		=
Ninth	2		Mass grave crimes	=	=
10^{th}	2		Chemical attack on Haiabja	=	
Eleven	2		Use of internationally	=	=
				=	

twelfth	2		Exam Environmental		=
Thirteenth	2		crimes of the baath regime in	=	
Fourth	2		Iraq		=
Fifteenth	2		Incidents of cemeteries and genocide committed dy the Baathist regime in Iraq	= =	=

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports 1.The theoretical exam inside the hall

2.The daily exam

3.Numders of activities within the class

4.Question-answer and exam

5.Monthly exam…. etc

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Course book
Main references (sources)	
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Course Description Form

1. Course Name:
English Language 2
2. Course Code:
UOM2022
3. Semester / Year:
Fall Semester/ 2026
4. Description Preparation Date:
Sept. 2025
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)
Dr. Sabreen Ali Abed Sabreen.abed@uomosul.edu.iq
8. Course Objectives

Course Objectives	The main Learning Outcomes of English language intermediate level for the second stage: ..... Developing student´s skills in English language includes the four skills: ..... • Listening objectives: Understand the main points of clear speech. • Reading Objectives: Understand basic language to read any topic on architecture. • Writing Objectives: write simply about familiar and architectural topics. • Speaking Objectives: extended communication skills in education contexts. Reflection on own learning and development, and ability to work with and relate to others.

9. Teaching and Learning Strategies	
Strategy	Learning and teaching strategies refer to instructors' methods and approaches to facilitate student learning and achievement of module learning outcomes. These strategies aim to engage students, promote understanding, and enhance their knowledge and skills in advanced English course. Here are the adopted learning and teaching strategies: 1. **Lectures and presentations**: the notes and the instructors are delivered through presentations introducing fundamental knowledge

	of English grammar and skills. 2. **Interactive discussions**: promotes active learning and thinking by engaging students in discussions. Instructors can facilitate class discussions on specific topics, encouraging students to share their insights, ask questions, and explore different perspectives.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A/3 C/3	Unit 1: A world of difference Present, past, present perfect tenses Auxiliary verbs Questions and negatives Short answers Sounding polite	Lecture	Classwork
2	2		Unit 2: The working week Present and continuous tenses State verbs	Lecture	Home work
3	2		Unit 3: Good time, bed Past tenses	Lecture	Quiz
4	2		Unit 4: Getting it right Modal and related verbs	Lecture	Classwork
5	2		Unit 5: Our Changing World Future forms Future possibilities	Lecture	Home work
6	2		Midterm Exam	exam	Exam
7	2		Unit 6: What matters to me Information questions	Lecture	Home work
8	2		Unit 7: Passions and fashions Present perfect Passive Adverbs Time expressions	Lecture	Classwork
9	2		Unit 8: No fear Verb patterns The infinitive The reduced infinitive	Lecture	Quiz
10	2		Unit 9: It depends how you look at it Conditionals Might have done/ could have done Should have done	Lecture	Home work
11	2		Unit 10: All things high tech	Lecture	Classw

			Noun phrases Possessives Reflexive pronouns and each other		ork
12	2		Unit 11: Seeing is believing Present and past Modals of probability Looks like / looks Expressing disbelief	Lecture	Quiz
13	2		Unit 12: Telling it how it is Reported Speech Reported thoughts Reported questions	Lecture	Home work
14	2		Reading and listening	Lecture	Home work
15	2		Reading and listening	Report	Classwork

11. Course Evaluation

		Time/Number	Weight (Marks)	Week Due	
Formative assessment	**Quizzes**	3	20% (20)	3, 9,12	
	Homework	6	6% (6)		
	Class Work	5	6% (6)		
	Report	1	8% (8)	15	
Summative assessment	**Midterm Exam**	1hr	10% (10)	6	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

12. Learning and Teaching Resources

Required textbook	**Soars, John, and Liz Soars. *New Headway Pre-Intermediate Student's Book*. 5th ed., Oxford University Press, 2019.**
Main references (sources)	

Course Description Form

1. Course Name:	
Fluid Mechanics II	
2. Course Code:	
ME251	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
20/4/2026	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Ataalah Hussain Jassim Email: ataalah.jasim@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	**Analyze Fluid Kinematics and Momentum Principles:** Apply impulse-momentum principles to calculate hydrodynamic forces acting on stationary and moving surfaces, nozzles, and pipe bends. **Evaluate Turbomachinery Performance:** Analyze the engineering mechanics and efficiency of propellers and impulse turbines (e.g., Pelton wheels) using velocity triangles and energy transfer equations. **Calculate Energy Losses in Piping Systems:** Estimate friction losses in pipes and calculate energy dissipation in pipe fittings and connections to design efficient fluid transport networks. **Master Similitude and Dimensional Analysis:** Utilize the Buckingham Pi Theorem to derive dimensionless parameters and apply similitude laws to design and relate engineering models to real-world prototypes. **Understand Real Fluid Behavior:** Distinguish between laminar and turbulent flow regimes and grasp the fundamental concepts of internal flow (conduits) and external flow (around bodies). **Analyze Boundary Layer Phenomena:** Define and understand the development of boundary layers and their essential role in fluid friction, flow separation, and pressure distribution. **Develop Engineering Problem-Solving Strategies:** Make informed decisions regarding physical assumptions and mathematical strategies required to simplify and solve complex real-fluid problems. **Technical Communication and Graphical Analysis:**Effectively utilize technical graphs and charts (such as the Moody diagram) to illustrate engineering results and communicate scientific idea
9. Teaching and Learning Strategies	
Apply impulse-momentum principles and applications, Demonstrate an understanding of ideal fluid flow, Describe similitude and dimensional analysis, Understand of basic viscous flows, and Calculate friction losses in pipes.	

10. Course Structure

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

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quizzes	20 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	10 point
Final	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...)	
Electronic References, Websites	

Course Description Form

1. Course Name:		
Thermodynamics II		
2. Course Code:		
ME 252		
3. Semester / Year:		
Spring / 2025-2026		
4. Description Preparation Date:		
19/4/2026		
5. Available Attendance Forms:		
In-person and Online		
6. Number of Credit Hours (Total) / Number of Units (Total):		
60/4		
7. Course administrator's name (mention all, if more than one name)		
Name: Dr. Ammar Younis Ibrahim Email: drammar2020@uomosul.edu.iq		
8. Course Objectives		
Course Objectives		• Analyze and interpret the concept of Entropy and its applications in real processes. • Evaluate Exergy (availability) and Second Law Efficiency of engineering systems. • Analyze Gas Power Cycles including Otto, Diesel, and Brayton cycles. • Model and analyze Vapor Power Cycles (Rankine cycle) and their improvements. • Understand Refrigeration cycles and Gas-Vapor mixtures (Psychrometry).
9. Teaching and Learning Strategies		
Strategy		The course uses advanced problem-solving exercises to deepen critical thinking. Students engage in lectures, interactive design projects of thermodynamic cycles, and simulation of power plant components to relate theoretical concepts to industria

10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A\1 B\2	Entropy: Definition, Clausius Inequality, and Increase of Entropy Principle.	lectures	-
2	4		Entropy change of pure substances and isentropic processes.	lectures	Home work
3	4		Isentropic efficiencies of engineering devices (Turbines, Nozzles, Compressors).	Lectures	Quiz
4	4		Exergy: Analysis of reversible work, irreversibility, and availability.	Lectures	Classwork
5	4		Gas Power Cycles: Basic considerations and Carnot cycle review.	Lectures	-
6	4		Otto Cycle: Ideal cycle for spark-ignition engines.	Lectures	Quiz
7	4		Diesel Cycle and Dual Cycle for compression-ignition engines.	Lectures	Home work
8	4		Brayton Cycle: Ideal cycle for gas-turbine engines.	lectures	Midterm Exam
9	4		Brayton cycle with regeneration, intercooling, and reheating.	Lectures	Classwork

10	4		Vapor Power Cycles: The Ideal Rankine Cycle.	Lectures	-
11	4		Reheat Rankine Cycle and Regenerative Rankine Cycle.	lectures	Quiz
12	4		Refrigeration Cycles: Vapor-Compression Refrigeration.	Lectures	Home work
13	4		Heat Pump Systems and innovative cooling cycles.	Lectures	Classwork
14	4		Gas-Vapor Mixtures: Humidity and the Psychrometric Chart.	Lectures	-
15	4		Air Conditioning Processes and course wrap-up.	Lectures	Home work

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

13.	14. Learning and Teaching Resources
	Power Plant Engineering, P.K. Nag, McGraw Hill, 2008
	• Thermodynamics: An Engineering Approach, Yunus A. Cengel & Michael A. Boles, 5 Ed.
	• Boiler Operation Engineering: Questions and Answers, P. Chattopadhyay, 2nd Ed.
	• Power Plant System Design, Li W., Priddy P., Wiley, 1985

Course Description Form

1. Course Name:	
Mechanics of materials-2	
2. Course Code:	
ME253	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
20/2/2026	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 / 4	
7. Course administrator's name (mention all, if more than one name)	
Lecturer: Asst. Prof. Dr. Anas Obeed Balod Email: anasbalod@uomosul.edu.iq 2nd Lecturer: Rwaa Abdallah Email: anasbalod@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Mechanics of materials (Strength of Materials) is a branch of applied mechanics that deals with the behaviour of solid bodies subjected to various types of loading and give the ability to calculate stresses, strains, shear stresses, shear strains, deformations, ... etc of objects under external loadings, as well as give the ability to increase the knowledge of strength of materials on engineering design and their applications.
9. Teaching and Learning Strategies	
Strateg	The course contributes to the following student outcomes: 8. Understand stress and strain in mechanical parts. 9. Classifying the types of stresses happening in machine by using mathematical formula for stresses. 10. Understand the basic concepts of mechanical properties for all materials. 11. Learning about the thermal effect on mechanical parts using thermal strain formula. 12. Understand the basic concepts of combined bar. 13. Recognize the basic concepts of torsion in circular shafts and bars. 14. Learning about how to draw the bending moment diagram and shear force diagram.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A2 B1 C3	Introduction– Strength of Materials.	lectures	
2-3	8		Simple Stresses and Strains. Thermal Stresses.	lectures	Homework#1
4-5	8		Shear stress and shear strain; Allowable Working Stress.		Quiz
6-7	8		Compound bar subjected to external load; Equivalent or combined modulus.	lectures	Homework#2
7-8	8		Compound bar subjected to temperature change; Problems.	lectures	Quiz
9-10	8		Shearing Force and Bending Moment Diagrams	lectures	
11-12	8		Point of Contraflexure; Relationship between S.F. and B.M. and intensity of loading.		report
13-14	6		Torsion	lectures	
15	3		Course review	lectures	Exam#2

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quiz	20 point
Problem-Based Learning exam	5 point
Mid Term Exam	10 point
Final Exam	50 point
Total	100 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	E. J. Hearn. “Mechanics of Materials.
Primary references (sources):	R. C. Hibbeler. “Strength of Materials.
Recommended books and references (scientific journals, reports)	Beer “Mechanics of Materials.

1. Course Name:	
Mathematics III	
2. Course Code:	
ME 254	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
21 /4 /2026	
5. Available Attendance Forms:	
Presence and online	
6. Number of Credit Hours (Total) / Number of Units (Total):	
90 / 8	
7. Course administrator's name (mention all, if more than one name)	
Dr Laith Mohammed Jasim / Email: jasiml68@uomosul.edu.iq Tara Nashwan Mohammed/ email: tara.nashwan@uomosul.edu.iq	
8. Course Objectives	
Course Objectiv	• Plot the functions of several variables, including level curves and level surfaces. Define and compute first- and second-order partial derivatives for functions of two or three independent variables, and interpret these derivatives geometrically as slopes of tangent lines to traces of the surface. • Formulate and solve problems involving Multiple integration over surfaces and volumes in 2D and 3D. • model physical quantities (displacement, velocity, force, work) as vectors, decompose vectors into components parallel and perpendicular to a given direction, and compute geometric quantities such as the area of a parallelogram, volume of a parallelepiped, and the shortest distance between skew lines. • Classify differential equations by type (ordinary/partial), order, linearity, and homogeneity; select and apply appropriate analytical methods to solve first- and second-order ODEs; and model mechanical and electrical systems (e.g., spring-mass-damper, RC circuits). • compute Laplace transforms and inverse Laplace transforms of elementary and piecewise-defined functions, apply properties such as shifting, scaling, and differentiation of

	transforms, and use the Laplace transform method to solve linear ordinary differential equations with given initial conditions. • compute the Fourier series of simple periodic functions, identify even and odd extensions, and interpret the series as a sum of sine and cosine waves that approximate the original function • Develop logical reasoning and problem-solving skills.

9. Teaching and Learning Strategies

Strategy	The primary strategy for delivering this module will be to encourage students to participate in exercises that refine and expand their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple engineering problems that involve sampling activities students find interesting.

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	6	A\1 A\4 C\3	Introduction to Multivariable Functions: Draw the graphs, level curves, and contours of functions of two variables, and the level surface of functions of three variables.	lectures	Homework
2	6		Domains, ranges, limits, and continuity of multivariable functions	lectures	Homework
3	6		The partial derivatives of a function of two and three variables, and partial derivatives of higher order, the Chain Rule, and Implicit differentiation.	lectures	Quiz
4	6		Multiple Integrals: Double and Triple iterated integrals over general regions.	lectures	Classwork
5	6		Applications of multiple integrals (masses, center of mass, and moments of inertia).	lectures	Homework
6	6		Ordinary Differential Equation; Classification of differential equations. Solution of differential equations (General and Particular Solutions).	lectures	Quiz
7	6		Arbitrary order ordinary DEs (Homogeneous Linear Equations of arbitrary (3rd, 4th ,….nth)	lectures	Homework

			order with constant coefficients:). Second order ordinary Des, Euler – Cauchy differential equation (Variable of parameter method, Second order DEs with variable coefficients)		
8	6		Application of second-order ordinary differential equations	lectures	Midterm Exam. Report
9	6		Laplace transform: Laplace transform definition, t – domain and S – domain, Laplace transform properties, Laplace transform of different functions (unit step function, constant function, t and tn functions, exponential function, trigonometric functions and hyperbolic trigonometric functions, Linearity of Laplace transformation theorem.	lectures	Classwork
10	6		Laplace Inverse Transform of different functions, denominator classification. The Laplace transforms of derivatives, solution of Differential Equations by Laplace Transformation	lectures	Homework
11	6		Vectors and the Geometry of Space: Introduction to the three-dimensional coordinate systems, Scalars and vectors. Represent vector quantities in the plane or in space, components, and the length of a vector. Operation on vectors: Vector addition and subtraction.	lectures	Quiz
12	6		Dot product and cross product, Properties of the dot and cross product, application proplem (Work, Torque, and other applications). Unit vector and Projection of a vector. Vector component of v perpendicular and parallel to u.	lectures	Homework
13	6		Scalar triple product, triple vector product, and their application. Write equations for lines and planes in space using scalar and vector products. Distance	lectures	Classwork

			between a point and a plane, and the angle between two planes.		
14	6		Introduction to Fourier series, Trigonometric form of Fourier series.	lectures	Homework
15	6		Arbitrary period, even and odd functions, and half-range expansions.	lectures	Homework
16	3		Final Exam.		Exam

11. Course Evaluation

Task	Weight (Marks)
Homework	10 %
Quizzes	10 %
Report	10 %
Classwork	10 %
Midterm Exam	10 %
Final Exam	50 %
Total	100 %

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. • Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2011
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:
Mechanical Engineering Laboratory I
2. Course Code:
ME256
3. Semester / Year:
Spring /2026
4. Description Preparation Date:
1/02/2026
5. Available Attendance Forms:
Manual attendance: The teacher categorizes students as present or absent in a list
6. Number of Credit Hours (Total) / Number of Units (Total):
45 hours / 3 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Omar Abdul Rahman Muhammad
8. Course Objectives

Course Objectiv	• The empirical basis of the theoretical concepts presented in the lectures. It is important that students have the opportunity to verify some of the ideas themselves. • Familiarization with experimental equipment and the scientific method to gain insight into the inductive process by which ideas are derived. Furthermore, the ability to make accurate experimental observations and to analyze experimental data and draw conclusions. • How to write a technical report that conveys scientific information clearly and concisely.

9. Teaching and Learning Strategies

Strategy	Using standard tools and techniques to conduct and design practical experiments on mechanical and electromechanical systems, and to accurately analyze and interpret the results. Applying modern engineering techniques, skills, and tools for intelligent control of mechanical systems.

10.Course Structure

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

1	3	1/A 1/B 3/B	Introduction to Engineering Laboratories I	lectures	N/O
2-3	6		Universal Beam Experiment	Experimental	Report
4-5	6		Hardness Test Experiment	Experimental	Report
6-7	6		Rope-belt Experiment	Experimental	Report
8-9	6		Impact of Water Jet Experiment	Experimental	Report
10-11	6		Tensile test	Experimental	Report
12-13	6		Center of Pressure Experiment	Experimental	Report
14	3		The midterm exam	Exam	-------
15	3		The final exam	Exam	---------

11.Course Evaluation

Task	Weight (Marks)
Attendance and participation	10 points
Report	30 points
Semester exam	10 points
Total:	50 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Experiment sheets
Main references (sources)	• Wheeler and Ganji, Introduction to Engineering Experimentation, Prentice Hall, 1996. • J. P. Holman, Experimental Methods for Engineers, McGraw-Hill, 2001 .
Recommended books and references (scientific journals, reports…)	Nothing
Electronic References, Websites	Nothing

Course Description Form

1. Course Name:
Computer2
2. Course Code:
UOM2032
3. Semester / Year:
Semester 2 / 2026
4. Description Preparation Date:
1 / 03 / 2026
5. Available Attendance Forms:
Presence (the student's presence in the class)
6. Number of Credit Hours (Total) / Number of Units (Total)
45hrs. / 3 ECTS
7. Course administrator's name (mention all, if more than one name)
Name: Eman Mohammedali Sulaiman Email: emanmali@uomosul.edu.iq
8. Course Objectives

• Course Objectives	• Teach and familiarize students with the concept of the Internet, communication networks, their technologies, classifications, and everything related to the topic. • Teaching students how to use the Internet correctly and in a way that benefits them scientifically • Introducing students to the concept of artificial intelligence, its most important technics, and the correct ways to benefit from it.
9. Teaching and Learning Strategies	
Strategy	• Board(Normal or Smart) • Computers • Presentation software such as PowerPoint.

10. Course Structure

Week	Hours	Required learning outcomes	Unit or subject name	Learning method	Evaluation method
1	3		computer hardware and software,	Theoretical+practical	

		A/4 B/4 C\2	Software and Hardware Interaction		• Daily, monthly, and final exams • Homework •Participation
2	3		Security and networking, what is the network, network types.	Theoretical+practical	
3	3		Basic network components	Theoretical+practical	
4	3		e-commerce, concept of electronic banking services, phone banking, SMS baking	Theoretical+practical	
5	3		Computer troubleshooting	Theoretical+practical	
6	3		Basic troubleshooting technique and tools	Theoretical+practical	
7	3		Introduction to AI, Define AI	Theoretical+practical	
8	3		AI technique and approaches	Theoretical+practical	
9	3		Monthly Exam	Theoretical+practical	
10	3		Challenges and ethical consideration	Theoretical+practical	
11	3		AI in our daily lifes	Theoretical+practical	
12	3		Application of AI , education, healthcare, marketing.	Theoretical+practical	
13	3		AI and society	Theoretical+practical	
14	3		Ethical challenges of AI	Theoretical+practical	
15	3		The future of AI	Theoretical+practical	
16	Pre-final exam week		Classroom tests		

11. Course Evaluation

Evaluation Type	Mark
Quiz (2)	10
Homework (2)	5
Lab	15
Report (1)	10
Midterm exam	10
Final exam	50

Final	100
12. Learning and Teaching Resources	
Required Textbooks (Methodology, if provided)	2015Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X
Primary References (Sources)	Ahmed Banafa { introduction to Artificial Intelligence (AI)} 1'st addition (2024) مدخل الى عالم الذكاء الاصـــطناعي (2005) الدكتور عادل عبد النور
Recommended Supplementary Books and References (e.g., Scientific Journals, Reports)	
Online Resources, Websites	Google Classroom/br6cngca

Course Description Form

1. Course Name:
Arabic Language2
2. Course Code:
UOM2012
3. Semester / Year:
Fall Semester/ 2026
4. Description Preparation Date:
22\1\2026
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2\30
7. Course administrator's name (mention all, if more than one name)
Sawsan Amin Khudair – sausan.zakar@uomosul.edu.iq
8. Course Objectives

Course Objectives	Develop students' skills in using the Arabic language correctly in academic and scientific contexts. Enable students to understand and analyze scientific and engineering texts written in Arabic. Develop students' written and oral expression in a clear and precise manner. Enhance functional writing skills related to engineering such as reports and official correspondence. Reinforce basic Arabic grammar rules for scientific and professional communication. Develop critical thinking and linguistic analysis skills. Enhance confidence in presentations and discussions.

9. Teaching and Learning Strategies

Strategy	Lectures Tutorials Quizzes Class works Home works Reports

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	A/3 C/2	Surah Yusuf / Hadith	Introduction / Surah Yusuf / Hadith	Quiz
3-4-5	6		Poetry (Al-Mutanabbi, etc.)	Lectures and Tutorials	Quiz
6	2		Relative Motion	Lectures and Tutorials	Home work
7	2		Morphology (nouns)	Lectures and Tutorials	Home work
8-9	4		Grammar) (numbers	Lectures and Tutorials	
10-11	4		Lexicon	Lectures and Tutorials	Quiz
12	2		Rhetoric	Lectures and Tutorials	
13-14	4		Literary applications	Lectures and Tutorials	
15	2		Common mistakes	Common mistakes	

11. Course Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	20% (20)	3, 8	LO #1
	Home Work	2	6% (6)		
	Class Work	1	6% (6)	2,6	LO#1
	Report	1	8% (8)	13	LO#1

Summative assessment	**Midterm Exam**	1hr	10% (10)	10	LO#1
	Final Exam	3hr	50% (50)	16	LO#1
Total assessment			100% (100 Marks)		

12. Learning and Teaching Resources

Required textbook	Main Reference: Jami‘ Al-Duroos Al-Arabiyyah – Mustafa Al-Ghalayini
Main references (sources)	Supporting: Mughni Al-Labib – Ibn Hisham / Sharh Ibn Aqil
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Website: Al-Maktaba Al-Shamela

Course Description Form

Third level

1. Course Name:
THEORY OF MACHINES
2. Course Code:
ME 301
3. Semester / Year:
Autum /2025-2026
4. Description Preparation Date:
01/09/2025
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total):
90 Hours/ 6 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Abdulhaqq A. Hamid E-mail: abdulhaqqhamid@uomosul.edu.iq Name: Mr. Yosuf Salim Mahmood E-mail: Yousif.alhadidi@uomosul.edu.iq
8. Course Objectives

Course Objectives	This course is intended to cover the essential theories and techniques of kinematic, kinetics and dynamics analysis of mechanisms and machines. Cam motion analysis, Balancing of rotating masses\Balancing of reciprocating masses. Clutches systems. Brakes systems. Belts, ropes, and chain drives. Gyroscopes: Gyroscope motion, Gyroscope couple analysis. Turning moment diagrams and flywheels. Governors. Gears and Gear traines.

9. Teaching and Learning Strategies

Strategy	The course contributes to the following student outcomes: 15. Students shall gain clear knowledge about the kinematic and dynamics of mechanisms and machines. 16. Students shall demonstrate a basic understanding of balancing different types of machinery. 17. Students shall demonstrate complete knowledge about wear and friction and their engineering applications in belt drives, clutches, and brakes. Also, it provides a complete analysis of static and dynamic forces. 18. Students can analyze and design the mechanical governors for a machine. 19. 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	6	LO#A-1	Fast review on Engineering Mechanics, Introduction to Theory of Machines and Fundemental and Basic concepts.	lectures	Quiz
2	6	LO#A-1	Position and Velocity analyses in Mechanisms.	Lectures	Quiz +Homeworks #1,2
3-4	12	LO#A-1	Accelerations determinations for different mechanisms.	Lectures	Quiz +Homeworks #3
5	6	LO#B-4	Modeling and analysis of position, velocity and acceleration in machines and mechanisms using Working Model (WM) Software.	Lectures and Computer Lab.	Quiz +Homework #4
6	6	LO#A-1	Gyroscopes: Gyroscope couple analysis. Solved examples	Lectures	Quiz + Home Work#5
7-8	12	LO#A-1	Mechanical Governors: Controlling force, and stability, Sensitivity, and insensitivity of governors.	Lectures	Homework#6
9-10	12	LO#A-1	Balancing of Rotating masses: Balancing of reciprocating masses:	Lectures	Exam#1
11	6	LO#A-1	Clutches systems: Disc or Plate, Conical and Centrifugal Clutches. Solved Examples.	Lectures	Quiz +Homework #7
12	6	LO#A-1	Cams, profile and motion	Lectures	Quiz
13	6	LO#A-1	Belts, ropes, and drives: Examples.	Lectures	Quiz
14	6	LO#A-1	Turning moment diagrams and flywheels: Solved examples.	Lectures	Homework#8
15	6	LO#A-1	Complete Course review.	Lectures	Exam#2

11. Course Evaluation

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: J. Hannah a R. C. Stephens, all editions, 1984, 2017.	
Recommended books and references (scientific journals, reports...): Any related books and journals.	
Electronic References: https://classroom.google.com/c/ODA5NzIwNjI3ODg5 (Class code : nbomgi4h)	

1. Course name:
Conduction Heat transfer
2. Course code:
ME302
3. Semester/Year:
Autumn /2026 – 2025
4. Date prepared this description :
2025 /10/1
5. Available attendance forms:
Attendance in classrooms and online attendance
6. Number of study hours (total)/number of units (total):
45hr/4 units
7. Name of the course administrator (if more than one name is mentioned)
Ass. Professor Maan Saadulden M. Al- Dabbagh maandabbagh@uomosul.edu.iq
8. Course objectives
▪ Enable the student to know the methods of heat transfer. ▪ Enabling the student to know the theoretical and practical concepts of the properties of physical materials and the effect of heat on them. ▪ Enabling the student to know the theoretical and practical concepts of heat transfer by conduction. ▪ Enabling the student to know the heat transfer in walls (plane, radial systems) ▪ This course serves as an introduction to the basic concepts and methods of heat transfer ▪ The objectives of this integrated subject are to develop the basic principles and laws of heat transfer and to explore the effects of these principles on the behavior of the system; Formulate the necessary models to study, analyze and design heat transfer systems by applying these principles. To develop problem-solving skills essential to good heat transfer engineering
9. Teaching and learning strategies

▪ Lectures ▪ Solve problems ▪ Monthly exams	▪ Daily exams ▪ Write a report

10. Course structure					
Week	**Hours**	**Required learning utcomes**	**Name of the unit or topic**	**Learning method**	**evaluation method**

1-2	3	1A,3B	Introduction, dimensions and units Heat transfer methods	Theoretical lectures and problem solving	
3-4	6	1A	Physical properties of materials (thermal conductivity, heat transfer coefficient)	Theoretical lectures and problem solving	Home work
5	3	1A	Steady state conduction - one dimension - (plane wall, radial systems(	Theoretical lectures and problem solving	Quiz
6-7	6	1A	Insulators, thermal resistance value, total heat transfer coefficient, critical thickness of insulators	Theoretical lectures and problem solving	Home work
8	3	3B,4C	Heat source systems, heat source cylinders, conduction systems - convection Examples and solved problems	Theoretical lectures and problem solving	Quiz
9	3	1A,4C	Semester exam		Semester exam
10-11	6	1A	extended surfaces area (fins) Examples and solved problems	Theoretical lectures and problem solving	Home work
12-13	6	1A	Unstable state of conduction Heat capacity of systems Heat flow in solids and semiconductors	Theoretical lectures and problem solving	Quiz
14	3	1A,3B	Examples and solved questions	Theoretical lectures and problem solving	
15	3		General review	Solve general problems	

11. Course evaluation	
Report	**%10**

Quiz	**%10**
Home works	**%10**
Mid-term exam	**%20**
Final Exam	**%50**
Total	**%100**

12. Learning and teaching resources

Required textbooks (methodology, if any)	Heat transfer , tenth edition(2010) , J.P. Holman , McGRAW hill international edition .
Main references (sources)	Fundamental of HEAT and MASS transfer, Seventh Edition,Theodre L. Bergman, Adrienne S, Lavine, Frank P. Incropera, David P. Dewitt John Wiley & Sons, 2011
Electronic references, Internet sites	

Course Description Form

1. Course Name:

Manufacturing Process /II

2. Course Code:

ME303

3. Semester / Year:

Fall / 2025

4. Description Preparation Date:

19/9/2025

5. Available Attendance Forms:

Attendance in classrooms and online attendance

6. Number of Credit Hours (Total) / Number of Units (Total)

75 Hours / 6

7. Course administrator's name (mention all, if more than one name)

Name: Ass. Prof. Amer Yahya Mohammed Aljarjees
Email: amer.aljerjees@uomosul.edu.iq

Name: Ass. Prof. Dr. Mohammed Najeeb Abdullah Mohammed
Email: moh_77@uomosul.edu.iq

8. Course Objectives

- Student should be able to understand various manufacturing metal forming processes
- Student will be able to design of die for metal forming for any forming processes.
- Student should be able to understand to select proper Advanced Manufacturing process for welding.
- Student will be able to choose welding machine for welding metal.
- Student will be able to explain principle and applications of advanced machining processes (Non – Traditional)

9. Teaching and Learning Strategies

- Lectures
- Homework
- Reports
- Exams
- Participations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1&2	10	(A1,B1,C1)	**Metal Forming,** Introduction Material behavior, Flow stress.		
3	5		**Rolling Operation,** Analysis of Flat Rolling, Neutral point		

4	5		**Extrusion Process,** Direct and indirect extrusion, analysis of Extrusion, impact extrusion	Theoretical and practical	• Daily, monthly, and end-of-year exams. • Homework •Participations
5	5		**Forging,** Open –Die Forging, close – Die Forgin		
6	5		**Wires and Bars Drawing** Analysis of wire drawing, bars drawing		
7	5		**Powder Metallurgy Techniques,** Characteristics of metal powders, property of Engineering powders, production of metal powders.		
8,9& 10	15		**Advance Welding Processes,** Submerged Arc Welding ,Plasma Arc Welding, Thermite welding, Friction welding		
11	5		**Numerical Control(NC),** Analysis of NC Positioning Systems, NC Part Programming .Application of NC)		
12,13 &14	15		**Non-traditional Machining Processes,** Electric Discharge Machining (EDM), Wire Cut , Electrochemical Machining Processes, Ultrasonic Machining		
15	5		Mid-term Exam		

11. Course Evaluation

Quizzes	10pt	Practical	10pt
Attendance	3pt	Monthly Exams	10pt
Home works	2pt	Mid term Exam	10pt
Reports	5pt	Final Exam	50pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	---
Main references (sources)	○ Mikell P.Groover. "FUNDAMENTALS OF MODREN MANUFACTURING _ MATERIAL PROCESSES AND SYSTEM". John Wiley and Sous. 2002. (can be downloaded from the Course web page). ○ 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:	
Combustion and Pollution	
2. Course Code	
MEC 304	
3. Semester / Year: Semester	
Full /2025 -2026	
4. Description Preparation Date:	
16/ 9 /2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (48) / Number of hours	
45 credit hours / 4 hours weekly	
7. Course administrator's name (Mention all, if more than one name)	
Name: Abdulrahman Habbo Mohammed Email: abidhabbo20@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To define combustion, (complete, incomplete and stoichiome combustion). • Classify combustion process and how can write chemical equation . • To introduce students to obtain air- fuel ratio • Push students to analyze exhaust gases • Students will be able to distinguish between fuels type • To introduce students to assess equivalence ratio • To Apply 1st law of thermodynamic applied to combustion process • To estimate the amount of heat release during combustion process • To distinguish between combustion products for different type of f • To be able to estimate adiabatic flame temperature • To apply second law of thermodynamic to combustion process • Develop their ability to estimate flame speed • Classify pollutants exiled to atmosphere such as CO_2 , HC, NOx • Introduce methods to reduce pollutants such as catalytic convertor
9. Teaching and Learning Strategies	
Strategies	The primary strategy of this course is to encourage students to 'participate in discussions and to solve problems some exercises. They also refine and expand their critical thinking skills to design machines' system components. This strategy achieved through classes, interactive tutorials, hands-on computer-based problem and by considering real applications that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	A/1 B/2 C/2	Combustion definition ,type	lectures	H.W1
3-4	6		Mixture of Ideal gases	lectures	Quiz1 & H.W
5-6	6		Calculation of air –fuel ratio	lectures	Quiz 2
7-8	6		Define equivalence ratio	lectures	H.W3
9-10	6		Exhaust gases analysis. Mole Analysis and mass analyses	lectures	Quiz4 & H.W4
11	3		1st law of thermodynamics Applied to combustion	lectures	
12	3		Calorific value of fuels, From table	lectures	Quiz 4
13 14 15	9		2nd law of thermodynamic Applied to combustion		

11. Course Evaluation

Task	Weight (Marks)
Quizzes	10 point
Homework	10 point
project	10 point
Patricians	10 point
Mid term Exam	10 point
Final exam	50 point
Total	100 points

12. Learning and Teaching Resources

Required textbooks : Principle of combustion by Kenneth Kuo K.Kuo 2006	Internal combustion engine fundamental by John Haywood 2001
Main references (sources)	Engineering fundamental of the interal combustion engine by Willard W Pulkrab 2011
Electronic References, Websites	

Course Description Form

1. Course Name:	
Gas Dynamics	
2. Course Code:	
ME305	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
1/10/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 / 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Yaser Shyker Mahmood Email: yaseralmola@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	**The third year under graduate course primarily intended for students mechanical engineering. There will be these parts:** 1- Mach number calculation. 2- Calculate the properties of compressible flow. 3- Integral and Transcendental functions. 4- Convergine Divergine Nozzle calculation 5- Fanno Flow Calculation
9. Teaching and Learning Strategies	
Strategy	After completion of the course, the student should be able to: 1. Calculate the Mach number of any objects. 2. Find the properties of the flow under different conditions. 3. Design the ducts and nozzles for all types of flow. 4. Calculate the properties of air before and after shock wave 5. Find the values of properties in and out C-D Nozzle 6. Calculate the sutable lenth of pipes to transport gases . 7. Find the properties of air when heat add to system

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	A\1 A\2	Introduction to Comressible fluid flow. Speed of sound	lectures	Quiz
3-4	6		Mach number Compressible flow in variable area duct	lectures	Quiz
5	3		Convergine Divergine Nozzle in compressible fluid flow		
6	3		Shock wave in convergine divergine nozzle		
7-8	6		Cpmpressible fluid flow in constant area duct with friction (Fanoo Flow)		
9-10	6		Shock wave in adiabatic fluid flow,		
11	3		Special Case of compressible fluid flow		
12-13	6		Discutons of students prgects		
14-15	6		Final Exam		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• C0mpressible Fluid Flow by Patric H. Oosthuizen first edition 1997 The Dynamic and Thermodynamics of Comressible Fluid Flow by Ascher H. Shapiro Volume 1 First edition 1953
Primary references (sources)	• Fundamentals of Gas Dynamics by Robert D.Zuker, Edition 2002 • Introduction to Fluid Mechanics by Robert T. Fox fifth edition 1993

Course Description Form

1. Course Name:	
Non-Destructive testing	
2. Course Code:	
MEC306	
3. Semester / Year:	
Autumn /2025-2026	
4. Description Preparation Date:	
1/10/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 3	
7. Course administrator's name (mention all, if more than one name)	
Lecturer: Asst. Prof. Dr. Anas Obeed Balod Email: anasbalod@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The primary objectives of a Non-Destructive Testing (NDT) course are to provide a comprehensive understanding of various NDT methods, enable the identification and characterization of defects in materials without causing damage, and ensure that personnel can apply these techniques according to industry standards and safety regulations.
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: • **Understand the basic principles** and physical backgrounds of different NDT methods, such as visual testing (VT), liquid penetrant testing (PT), magnetic particle testing (MT), ultrasonic testing (UT), eddy current testing (ET), and radiographic testing (RT). • **Select the appropriate NDT technique** and method for specific materials, components, or applications. • **Set up, calibrate, and operate** NDT equipment correctly. • **Perform and supervise tests** in accordance with established procedures. • **Interpret and evaluate** test results and indications with respect to applicable codes, standards, specifications, and procedures (e.g., ASME, ASTM, AWS, ISO 9712). • **Identify and characterize** various types of discontinuities, flaws, and material imperfections (e.g., cracks, voids, corrosion, lack of fusion in welds). • **Document and report** the results of NDT inspections clearly and effectively to specialist and non-specialist audiences. • **Apply safety precautions** and work within the safety norms inherent to each specific NDT method, especially concerning radiation safety in RT.

	• **Define the scope and limitations** of each NDT method.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A1 B1 C1	Introduction-Non-Destructive testing	Lectures	
2-3	4		Visual inspection	Lectures	Homework#1
4-5	4		Dye penetration testing	Lectures	Quiz
6-7	4		Magnetic particle testing	Lectures	Homework#2
7-8	4		Ultrasonic testing	Lectures	Quiz
9-10	4		Radiography inspection	Lectures	
11-12	4		Eddy current testing	Lectures	report
13-14	4		Testing steps	Lectures	
15	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):	1- nondestructive testing handbook. by: Robert C. McMaster. Publication date: 1959. Collection: internetarchivebooks; inlibrary; printdisabled. 2- Nondestructive Testing Handbook, Third Edition Volume 2, Liquid. 3- A - Nondestructive Testing Handbook, Ut, Vol. 7, 3rd Ed 1996.
Primary references (sources):	-Introduction to Non-Destructive Testing / Failure Analysis and NDT Techniques by Dr. V. Jayakumar from Lakshmi publications,OML351.
Recommended books and references (scientific journals, reports)	Practical Non-destructive Testing. Baldev Raj, T. Jayakumar, M.
Electronic References: https://classroom.google.com **Class code:**	https://classroom.google.com tepu7u7e

1. Course Name:
Mechanical Considerations
2. Course Code:
MEC307
3. Semester / Year:
Spring / 2026
4. Description Preparation Date:
2026 /04 /16
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)
Dr Ziad Shakeeb Al Sarraf ziadalsarraf@uomosul.edu.iq
8. Course Objectives
Introduction to Mechanical Considerations is a mandatory course for mechanical engineering students. This course provides an introduction to the fundamental principles of modern engineering. It equips students with essential skills in mechanical considerations, the ability to apply scientific theories practically, and an understanding of the factors affecting machine components, such as shafts, springs, belts, bearings, and gears, including stresses, deformations, and failure parameters. The primary objective of mechanical considerations is to ensure that machines operate efficiently to meet customer needs and are safe against anticipated failure patterns.
9. Teaching and Learning Strategies

▪ **Exams** ▪ **Participations**	▪ **Lectures** ▪ **Homeworks** ▪ **Reports**

10. Course Structure

Evaluation	Learning method	Unit or subject name	Learning Outcomes	Hours	Week
Homeworks • and class works	Theory	Introduction to Machine Element Design:	nowledge A1	2	1
				2	2
		1. Understanding the principles of machine element design		2	3
				2	4
				2	5
		2. Estimating the required properties of materials used in machine element design	Skills B1	2	6
				2	7
				2	8
		3. Classifying, calculating, and analyzing stresses generated in machine elements		2	9
				2	10
		4. Identifying types of failures that may occur in machine elements	valuations C3	2	11
				2	12
				2	13
				2	14
		5. Shaft design 6. Switch and connection design 7. Belt design 8. Chain design 9. Bearing design and selection 10. Design of welded and bolted connections 11. Power screw design 12. Spring design 13. Pressure vessel design		2	15

11. Course Evaluation

%10	**Reports**
%10	**Homeworks**
%20	**Mid-Term Exam**
%60	**Final Exam**
%100	**Overall**

12. Learning and Teaching Resources

Design of Machine Elements by V. B. Bhandari (The best one is Machine Design Data Book)	Required textbooks (methodology, applicable)
Machine Element in Mechanical Design by R. Mott (Fourth Edition, and more) Mechanical Engineering Design by Shigley's (Ninth Edition)	Main references (sources)
Design of Machine Elements by V. B. Bhandari (The best one is Machine Design Data Book)	
Follow global websites	Electronic references, websites

1. Course Name:
Design of Machine elements
2. Course Code:
MEC351
3. Semester / Year:
Spring / 2026
4. Description Preparation Date:
2026 /04 /16
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total):
105 / 6
7. Course administrator's name (mention all, if more than one name)
Dr Ziad Shakeeb Al Sarraf ziadalsarraf@uomosul.edu.iq
8. Course Objectives
Introduction to Design of Machine parts is a required course for mechanical engineering students. This course is an intermediate to the basic principles of modern engineering. It provides the students with fundamental skills of engineering and the ability to apply the theories of science to practice and understand the factors; such as stresses, deformations, and failure criteria, influencing the machine elements like shafts, springs, belts, bearings, gears etc. The main objective of design of machine parts is that the machine should function properly to satisfy the needs of the customer and it should be safe against the predicted modes of failure.
9. Teaching and Learning Strategies

▪ Exams ▪ Participations	▪ Letures ▪ Homeworks ▪ Reports

10. Course Structure					
Evaluation	**Learning method**	**Unit or subject name**	**Learning Outcomes**	**Hours**	**Week**

Quizzes • Homewo • rks	نظري	Introduction to Design of Machine Elements will be able to: 1- Know the principles of Design of Machine Elements 2- Estimate the required properties of the material used in machine elements design 3- Classify, Calculate and analyze the stresses induced in Machine elements. 4- Define type of failure resulted in Machine elements. 5- Design of shafts. 6- Design of keys and coupling. 7- Design of belts. 8- Design of chain. 9- Design and selection of bearings. 10- Design of welded, riveted and bolted joints. 11- Design of power screws. 12- Design of springs. 13- Design of pressure vessels.	owledge A1 A2	7	1
				7	2
				7	3
				7	4
				7	5
			Skills B1	7	6
				7	7
				7	8
				7	9
				7	10
				7	11
				7	12
				7	13
				7	14
				7	15

11. Course Evaluation

Home works	5 pt	1st term Exam	10 pt
Quizzes	10 pt	2nd term Exam	10 pt
Attendance	3 pt	Final Exam	60 pt

12. Learning and Teaching Resources

Design of Machine Elements by V. B. Bhandari (The best one is Machine Design Data Book)	Required textbooks (methodology, applicable)
Machine Element in Mechanical Design by R. Mott (Fourth Edition, and more) Mechanical Engineering Design by Shigley's (Ninth Edition)	Main references (sources)
Any Other Relevant Books.	Electronic references, websites

1. Course name:
Convection Heat transfer
2. Course code:
MEC352
3. Semester/Year:
Autumn /2026 – 2025
3. Date prepared this description :
2026/2/1
4. Available attendance forms:
Attendance in classrooms and online attendance
5. Number of study hours (total)/number of units (total):
45hr/4 units
6. Name of the course administrator (if more than one name is mentioned)
Ass. Professor Maan Saadulden M. Al- Dabbagh maandabbagh@uomosul.edu.iq
7. Course objectives
▪ Enable the student to know the methods of heat transfer. ▪ Enabling the student to know the theoretical and practical concepts of the properties of physical materials and the effect of heat on them. ▪ Enabling the student to know the theoretical and practical concepts of heat transfer by convection. ▪ The objectives of this integrated subject are to develop the basic principles and laws of heat transfer and to explore the effects of these principles on the behavior of the system; Formulate the necessary models to study, analyze and design heat transfer systems by applying these principles. To develop problem-solving skills essential to good heat transfer engineering practice in real-world applications. ▪ This course is an introduction to the principal concepts and methods of heat transfer. Enable the student to know theoretical and practical concepts of the physics materials properties and heat effect on it and to know theoretical and practical concepts of the convection and Radiation heat transfer. Also to know the heat transfer from the fluid to the wall surface ▪ The objectives of this integrated subject are to develop the fundamental principles and laws of heat transfer and to explore the implications of these principles for system behavior; to formulate the models necessary to study, analyze and design heat transfer systems through the application of these principles; to develop the problem-solving skills essential to good engineering practice of heat transfer in real-world applications ▪ difference method, The performance analysis of heat exchangers ▪ Radiation heat transfer , radiation properties, black body radiation
8. Teaching and learning strategies

▪ Lectures	▪ Daily exams

▪ Solve problems ▪ Monthly exams	▪ Write a report

10. Course structure

Week	Hours	Required learning utcomes	Name of the unit or topic	Learning method	evaluation method
1-2	3	1A,3B	Principle of convection, laminar and turbulent boundary layer.	Theoretical lectures and problem solving	
3-4	6	1A	Laminar and forced convection over flat plate Solved problem chapter No.5	Theoretical lectures and problem solving	Home work1, Quiz
5-6	6	1A	Laminar and Turbulent flow in pipe, Flow across cylinder, flow across Tube Bundles Solved problem chapter No.**6**	Theoretical lectures and problem solving	Quiz
7-8	3	1A	Natural convection over surfaces Flat plate horizontal and vertical Solved problem chapter No.**7**	Theoretical lectures and problem solving	Home work2
9-10	6	3B,4C	Natural convection from horizontal and vertical cylinder Examples and solved problems	Theoretical lectures and problem solving	Homework 3,4 Quiz
11	3	1A,4C	Semester exam		Semester exam
12-13	9	1A	Heat exchangers, types of heat exchangers , overall heat transfer coefficient, fouling factor, the log mean temperature difference method.	Theoretical lectures and problem solving	Home work5
14	6	1A,3B	Radiation properties , radiation shape factors ,	Theoretical lectures and	Quiz

			radiation shields , heat transfer between two bodies	problem solving	
15	3		General review	Solve general problems	
16			Final Exam.		

11. Course evaluation	
Report	**%10**
Quiz	**%10**
Home works	**%10**
Mid-term exam	**%20**
Final Exam	**%50**
Total	**%100**

12. Learning and teaching resources	
Required textbooks (methodology, if any)	Heat transfer , tenth edition(2010) , J.P. Holman , McGRAW hill international edition .
Main references (sources)	Fundamental of HEAT and MASS transfer, Seventh Edition,Theodre L. Bergman, Adrienne S, Lavine, Frank P. Incropera, David P. Dewitt John Wiley & Sons, 2011
Electronic references, Internet sites	

Course Description Form

1. Course Name:	
Numerical Analysis	
2. Course Code:	
ME353	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Attendance in classrooms	
6. Number of Credit Hours (Total) / Number of Units (Total):	
90 / 6	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Saddam Atteyia Mohammad Dr. Mahmoud Osama Jassim Email: saddamatteyia@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The course covers different analytical and numerical topics, including 1. special functions (Gamma function and Beta function). 2. Partial differential equations PDEs, (One-dimensional wave equation, one-dimensional heat equation, two-dimensional Laplace equation). 3.Complex numbers. 4. Solution of equation by iteration. 5. Solution of system of linear equations using numerical technique. 6. Curve fitting (linear regression). 7. Numerical integration and numerical differentiation. 8. Numerical solution for first-order differential equation. Therefore, the course objective is to solve engineering problems analytically and/or numerically.
9. Teaching and Learning Strategies	
Strategy	The main strategy of this semester is: 8. Understand some special functions (Gamma function and Beta function). 9. Using mathematical manipulation to solve problems of Gamma and Beta functions.

	10. Understand the basic concepts of partial differential equations and the related initial and boundary conditions. 11. Classifying the types of partial differential equations. 12. Applying separation of variables method to solve wave, heat, and Laplace equations. 13. Formulating the general and particular solutions of partial differential equations. 14. Finding solutions to complex numbers. 15. Numerically obtain the solution of equation by iteration. 16. Find the solution of system of linear equations using numerical technique. 17. Be able to make curve fitting. 18. Make numerical integration and numerical differentiation. 19. Obtain numerical solution for first-order differential equation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	LO# 4A LO# 4B LO# 3C	-Special functions: Gamma function with solution of problems. -Concept and role of the numerical methods in engineering, approximations, and errors, the definition of round-off error and truncation error, absolute and relative error.	lectures	Home work #1
2-3	10		-Solution of problems on Gamma function. - Numerical Integration: Trapezoidal Rule, Simpson's 1/3 Rule	lectures	Quiz
4-5	10		-Beta function with solution of problems. - Numerical Differentiation: Taylor Series and truncation error, The approximation of the first derivative (FDA, BDA, and CDA), The approximation of the second derivative (FDA, BDA, and CDA).	lectures	Home work #2
6-7	10		-Solution of problems on Beta function. -Curve Fitting: Classification of	lectures	Quiz

			Curve Fitting (Regression and Interpolation), the concepts of regression, and Least Square Criterion, Linear Regression.		
8-9	10		-Partial differential equations PDEs - Numerical Solution of Nonlinear Algebraic Equations (Roots of Equations): Bracketing Methods (Bisection, and False-Position method), Open Methods (Newton-Raphson and secant method).	lectures	Mid-term exam
10-11	10		-Laplace equation and its solution with solution of problems. - Numerical Solution of linear Algebraic equations (system): the difference between the direct and indirect methods, Singular and ill/well-conditioned system, Partial and complete Pivoting, Convergence Criteria, Jacobi iterative method, The Gauss-Seidel iterative method, Gauss-Seidel iterative with the relaxation Factor method.	lectures	Quiz
12-13	10		-Complex number, complex plane - Numerical Solutions of Ordinary Differential Equation (ODE): Classification of Differential Equations (Initial Value Problem "IVP" and Boundary Value Problem "BVP"), The numerical methods for solving the IVP (Euler's method and modified Euler's method)	lectures	Problem-based learning exam
14	5		-The polar form of complex numbers - Fourth order Runge-Kutta method for solving the IVP, Numerical solution for systems of ODEs with the two methods above.	lectures	Quiz
15	5		Integer powers of Z, roots, solution of problems.	lectures	

11. Course Evaluation

Task	**Weight (Marks)**
Homework	15 points
Quiz	15 points
Problem-Based Learning exam	10 points
Mid-term Exam	10 points
Final	50 points

Total	100 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. -Steven C. Chapra and Raymc P. Canale, "Numerical Methods f Engineers: With Software and programming Applications", Fourth Edition, 2003.
Recommended books and references (scientific journals, reports)	
Electronic References:	https://classroom.google.com **Class code:** chqnnsrr

Course Description

1. Course Name:
Engineering Management and Economics
2. Course Code:
ME354
3. Semester / Year:
Spring 2025/2026
4. Description Preparation Date:
19 / 4 / 2026
5. Available Attendance Forms:
Theoretical lectures + discussion lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Khalid Abdullah Khider Email: khalid.khider@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. To familiarize the student with the importance of studying Engineering Management and Economics. 2. To familiarize the student with the importance of cost control in engineering projects. 3. To train the student in selecting project sites. 4. To train the student in conducting economic studies, comparisons, and alternatives.

9. Teaching and Learning Strategies	
Strategy	The lectures include theoretical discussions and dialogues, in addition to the presentation of realistic economic studies.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A3 B2 C3	General concepts of engineering economics and sustainability	Learning and discussion	Discussion
2,3,4	12		Engineering Management (Definitions and Concepts).	Learning and discussion	Discussion and homework
5,6	8		• The relationship between management levels and managerial skills in engineering management. • Innovative decision-making methods and decision-making stages.	Learning and discussion	Discussion and homework
7,8	8		• Project management, project development phases, and project components. • Project monitoring methods.	Learning and discussion	Discussion and homework
9,10,11	12		• Simple ranking, quality ranking, and value-based ranking. • Critical path analysis.	Learning and discussion	Home works
12,13	8		• Factory site selection (concepts, objectives, components, and importance). • Factors influencing site selection.	Learning and discussion	Home works
14,15	8		• Quality control (concept, development stages, and dimensions). • Maintenance management and its importance.	Learning and discussion	Discussion and homework

11. Course Evaluation

Daily preparation	%10
Report	%10
Daily quizzes	%10

Homework	**%10**
Midterm exam	**%10**
Final exam	**%10**
Total	**%100**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**Project Evaluation**
Recommended books and references (scientific journals, reports…)	**1. Engineering Project Management, by Dr. Hamdi Taha.** **2. Total Quality Management and ISO Requirements, by Dr. Khalil Al-Ani.**
Electronic References, Websites	

Course Description Form

1. Course Name:	
Internal Combustion Engines	
2. Course Code:	
MEC 353	
3. Semester / Year:	
Semester	
4. Description Preparation Date:	
2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
45 credit hours / 4 units	
7. Course administrator's name (Mention all, if more than one name)	
Name: Abdulrahman Habbo Mohammed Email: abidhabbo20@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Classify the internal combustion engines. Calculate air standard cycles performance. Describe the main differences between Otto, Diesel and Dual cycles. Analysis the fuel-air cycle and make a comparison with actual cycles. Describe the combustion phenomena in S.I. engines and C.I. engines. Classify the gas turbine units and their cycles, simple and modified cycles. Classify the air craft engines and performance calculation, turbojet engine , turbo-fan and turbo propeller Analysis the exhaust emission from internal combustion engine. Introduce suitable method for reducing exhaust emission such as CO, HC, SO_x, NO_x and others.
9. Teaching and Learning Strategies	
Strategies	This course provides an introduction to internal combustion engines , type of engines, , combustion definition and types, Air standard cycles , definitions a Calculation (Otto cycle , Diesel cycle and Dual cycle) . Fuel-air cycles, Assumpt and calculation . Actual engines cycles . Criteria performance of internal combust engines (spark ignition , diesel engines and dual engines) which involve determinat of thermal efficiency , specific fuel consumption , mean effective pressure and pov out. Combustion phenomena in both spark ignition engine and compression ignit engines, Knock and surface ignition . Gas turbine cycles , simple cycle and modif cycles, and calculation of performance. Turbojet engine, turbofan , turbo propeller

	craft engines and their performance. Finally exhaust emission from inter combustion engines, methods are used to reduce emission and after treatment meth such as thermal and catalytic convertor.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	A/1 B/2 C/3	**Introduction to Combustion**	lectures	**H.W1**
3-4	6		Mixture of ideal gases	lectures	**Quiz1 & H.W2**
5-6	6		1st law of thermo applied combustion	lectures	**Quiz 2**
7-8	6		2ndLaw of thermo applied to combustion	lectures	**H.W3**
9-10	6		Classification of inter combustion engines	lectures	**Quiz4 & H.W4**
11	3		Air standard cycles Otto, & Diesel and Dual	lectures	**H.W5**
12	3		Performance of I.C.Engines	lectures	**Quiz 5**
13-15	9		Fuel –Air & Combustion Phenomena in Engines	Exams	

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 : Internal Combustion Engine Fundamenta John Heywood 2005	Internal Combustion Engines , Colin Ferguson 2000
Main references (sources)	

Course Description Form

1. Course Name:
Mechanical Engineering Lab II
2. Course Code:
ME356
3. Semester / Year:
Spring /2026
4. Description Preparation Date:
1/2/2026
5. Available Attendance Forms:
Manual attendance: Instructor marks students as present/absent in a list.
6. Number of Credit Hours (Total) / Number of Units (Total):
45 / 4
7. Course administrator's name (mention all, if more than one name)
Mohammed Shaalan Abed Fathi
8. Course Objectives

Course Objectives	1. Experimental foundation for the theoretical concepts introduced in the lectures. It is important that students have an opportunity to verify some of the ideas by themselves. 2. Familiarizing with experimental apparatus, and the scientific method in order to have ideas of the inductive process by which the ideas were originated. In addition, to be able to make careful experimental observations and how to think about and draw conclusions from experimental data. 3. Learning how to write a technical report which communicates scientific information in a clear and concise manner.

9. Teaching and Learning Strategies

Strategy	Using standard tools and techniques to conduct and design practical experiments for mechanical and electromechanical systems and correctly analyze and interpret the results. Application of techniques, skills, modern engineering tools, and smart control on mechanical systems.

10. Course Structure

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

1	3		Introduction to laboratories and safety measures	lectures	Seminar
2	3		Measurement errors	lectures	Report
3	3		**Fluid Laboratory** Pelton turbine I	Experimental procedures	Report
4	3		**Fluid Laboratory** Pelton turbine II	Experimental procedures	Report
5	3	**A\1 B\3 C\4**	**Heat Transfer Laboratory** Forced convection from a cylinder in a cross flow. I	Experimental procedures	Report
6	3		**Heat Transfer Laboratory** Forced convection from a cylinder in a cross flow. II	Experimental procedures	Report
7	3		**Applied Mechanics Laboratory** Gyroscope effects I	Experimental procedures	Report
8	3		**Applied Mechanics Laboratory** Gyroscope effects II	Experimental procedures	Report
9	3		**Applied Mechanics Laboratory** Dynamic balancing I	Experimental procedures	Report
10	3		**Applied Mechanics Laboratory** Dynamic balancing II	Experimental procedures	Report
11	3		**Heat Transfer Laboratory I** One-dimensional heat conduction	Experimental procedures	Report
12	3		**Heat Transfer Laboratory II** One-dimensional heat conduction	Experimental procedures	Report
13	3		Complementary weeks and review of submitted reports	Seminar	Seminar
14	3		Rubric exam		
15	3		Term exam		

11. Course Evaluation

Task	Weight (Marks)

Attendence and Activity	10 points
Repoty	30 points
Term exam	10 points
Total	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Data sheets for the experiments. (can be downloaded from the Course web page). Textbooks in the different experiment-related fields – mentioned above
Primary references (sources)	None
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	No websites

Course Description Form

1. Course Name:	
Applied Chemistry	
2. Course Code:	
ME357	
3. Semester / Year:	
Spring /2026	
4. Description Preparation Date:	
1/2/2026	
5. Available Attendance Forms:	
Manual attendance: Instructor marks students as present/absent in a list.	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 / 2	
7. Course administrator's name (mention all, if more than one name)	
Dr. Abdul Al-Haqq Al- Dabagh – Mohammed Shaalan Abed – Noor Al-Deen Khidhr	
8. Course Objectives	
Course Objectives	Upon successful completion of this course, students will be able to: • Explain the mechanisms of corrosion and evaluate appropriate prevention techniques. • Define air pollution and identify its major components and sources. • Assess the impact of engine operating conditions on performance and pollutant emissions. • Apply principles of ideal gas mixtures and combustion in engineering contexts. • Describe common water treatment processes and their applications. • Identify basic types of polymers and explain their properties and uses
9. Teaching and Learning Strategies	
Strategy	• **Interactive Lectures:** Core concepts are introduced through structured lectures -shown below- supported by real-life examples from environmental, industrial, and energy systems. • **Problem-Based Learning (PBL):** Students engage in solving practical problems related to corrosion, pollution control, combustion, and water treatment. • **Case Studies:** Analysis of real-world scenarios such as industrial corrosion failures, urban air pollution episodes, and water treatment systems. • **Group Discussions and Collaborative Learning:** Students work in teams to analyze operational factors affecting pollution and propose mitigation strategies for pollutants.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A\1 B\1 C\1	Scope and importance of applied chemistry Relationship with environmental, materials, and energy sciences Overview of course topics and applications	lectures	Quiz
2	2		Definition and types of corrosion (uniform, galvanic, pitting) Electrochemical principles of corrosion	lectures	report
3	2		Protective coatings and surface treatments Cathodic and anodic protection methods Material selection and environmental considerations	lectures	Quiz
4	2		Definition and classification of air pollution Primary vs. secondary pollutants Global and local perspectives	lectures	HW
5	2		Major pollutants: CO, NO_x, SO_2, particulate matter, hydrocarbons Natural vs. anthropogenic sources Urban vs. industrial emissions	lectures	Quiz
6	2		Environmental effects (acid rain, global warming, ozone depletion) Health impacts on humans Air quality standards and monitoring	lectures	report
7	2		Types of engines Fuel properties and combustion characteristics Introduction to emission formation	lectures	Quiz
8	2		Air-fuel ratio, temperature, pressure, and timing Effect on efficiency and pollutant formation Emission control technologies	lectures	HW
9	2		Properties of ideal gases Dalton's Law of Partial Pressures. Applications in combustion and atmospheric chemistry	lectures	Quiz

10	2		Types of combustion (complete and incomplete) Stoichiometry of combustion reactions Energy release and efficiency	lectures	Quiz
11	2	A\1 B\1 C\1	Sources and types of water pollution Physical treatment methods (filtration, sedimentation) Water quality parameters	Lectures	Project
12	2		Chemical and biological treatment methods Disinfection (chlorination, ozonation) Wastewater treatment basics	Iectures	Project
13	2		Definition and classification (thermoplastics, thermosets) Polymerization processes (addition, condensation) Structure–property relationships	lectures	Quiz
14	2		Industrial and environmental applications of polymers Recycling and environmental impact of plastics Comprehensive review and integration of course topics	lectures	HW
15			Term exam		

11. Course Evaluation

Task	Weight (Marks)
Homework	5 point
Quizzes	15 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	15 point
Total	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Applied Chemistry: A Textbook for Engineers and Technologists, Springer, 2nd Edition, 2013
Primary references (sources)	None
Recommended books and references (scientific journals, reports...)	Journal of applied Chemistry
Electronic References, Websites	No websites

Course Description Form

1. Course Name:	
Engineering Project, Design and Planning	
2. Course Code:	
ME358	
3. Semester / Year:	
Spring /2026	
4. Description Preparation Date:	
20/4/2026	
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: Ataalah Hussain Jassim Email: ataalah.jasim@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• To enable students the ability to employ the skills they have learnt in their course program to solve and/or enhance an opportunity. • To enable students to explore, study, and develop a specificshowcase, independently. • To enrich students' business strategy development and operational implementation relevant to their organizations and/or personal needs.
9. Teaching and Learning Strategies	
Strategy	• require students to employ their learned skills (e.g., pipe network analysis or dam pressure calculations) to solve or enhance a specific engineering opportunity. • **Independent Research & Case Studies:** Enabling students to explore and study a specific fluid phenomenon or a "showcase" technology (such as a specific type of pump or flow meter) independently to develop a technical presentation or model. • **Applied Strategic Design:** Integrating business and operational logic by asking students to develop fluid systems that are not only technically sound but also cost-effective and operationally feasible, relevant to industrial standards or personal innovative needs. • **Iterative Design & Implementation:** Encouraging students to go through the cycle of "Plan, Design, and Evaluate," where they must implement their theoretical knowledge into a practical operational framework.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A\1 B\1 C\1	Graduation Project , Description	lectures	Quiz
2-3	4		Project Topic, Students and Their Roles	lectures	Homework
4	2		Project Phases.	lectures	
5	2		Phase 1: Project Proposal - Initial Evaluation	lectures	Quiz
6	2		Phase 2: Project Proposal - Midterm Evaluation	lectures	
7	2		Phase 3: Project Proposal - Final Evaluation	lectures	Quiz
8	2		Phase 4: Project Implementation - Midterm Evaluation.	lectures	Report
9	2		Phase 5: Project Implementation.	lectures	Quiz
10	2		Discussion and Evaluation	lectures	
11	2		Methods Of Discussion and Evaluation		
12	2		Grading Policy		
13	2		Frequent Questions during the Discussion		
14	2		Formatting Structure of the Project		
15	2		Academic Integrity/Plagiarism, Appendices		

11. Course Evaluation

Homework	5 point
Quizzes	20 point
Projects	7.5 point
Report	7.5 point
Midterm Exam	10 point
Final	50 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering Design: A Project-Based Introduction, Clive L. Dym, Patrick Little, and Elizabeth Orwin, Harvey Mudd College. – 4th edition, 2014, Wiley
Primary references (sources)	Project Management for Engineering, Business and Technology, John M. Nicholas and Herman Steyn, 7th Edition. First Published 2025.
Recommended books and references (scientific journals, reports...)	

Course Description Form

Forth level

1. Course Name:	
Machine Design System 1	
2. Course Code:	
ME401	
3. Semester / Year:	
Autumn /2025	
4. Description Preparation Date:	
8/9/2025	
5. Available Attendance Forms:	
Attenance	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2 / 30	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa D. Younis Email: alaayonis@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Analyze material failure modes and establish various stresses and failure theories on static and dynamic loading CO-2 • Analyze high, low cycle fatigue and interpretation of data by combined loading CO-3 • Design and predict the fracture strength of mechanical components CO-4 • Design mechanical components involving contacts avoiding the surface failures.
9. Teaching and Learning Strategies	
Strategy	An introduction to clutches, their purpose, how they work, in general and, developing a mathematical set of equations to calculate the outline dimensions of a friction type of clutches, whether they are of single disk or multiple disk clutch type. Introduction to brakes, their purpose, and how they work. The development of mathematical set of equations to calculate the outline dimensions of a friction type of brakes and their torque capacity, whether they are of internal or external drum brakes. Introduction to Gears, which include the classifications of gears, Gear theory, Gear ratio. Design aspects of gears using Lewis's formula for bending stress and Hertz theory for contact stress. Design aspects using AGMA design formulas for bending and contact stresses. Design of power screws.
10.Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	A2 B1 C3	Clutch Design Tutorial Sheet No.1	lectures	Quiz
4-8	10		Brake Design Tutorial Sheet No.2	lectures	Quiz
9-10	4		Gear Design (*Lewis Bending Equation)* Tutorial Sheet No.3	lectures	Quiz +
11-13	6		Gear Design AGMA Tutorial Sheet No.4	lectures	Exam
14-15	4		Review of course subjects	lectures	Exam

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)	Machine Elements in Mechanical Design, 6th edition. Robert L. Mott, Edward M. Vavrek and Jyhwen Wang, Pearson Prentice Hall. 2018.
Main references (sources)	Shigley's Mechanical Engineering Design, 10th edition. R Budynas and J. K. Nisbett. 2015
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Control and measurements I	
2. Course Code:	
ME402	
3. Semester / Year:	
Autumn /2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2\30	
7. Course administrator's name (mention all, if more than one name)	
Name: Khalid Elias Hammo Email: khalid1974@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Modeling of subsystem and systems for the purpose of control. • Determining transfer function for different system components, first order subsystem and time constants applied to mechanical, thermal, fluidic, electrical, …. Etc. • Building block diagrams to represent open loop and closed loop control systems. • . Block diagram algebra for simplifying complicated block diagram of systems. • Modeling and building a complete block diagram. • Analyzing steady-state operation of feedback control system.
9. Teaching and Learning Strategies	
Strategy	Mathematical Modeling: Utilizing first principles to establish transfer functions for diverse engineering components (mechanical, thermal, fluidic, and electrical).Analytical Techniques: Applying linearization to non-linear relationships to enable the use of linear control theory.System Visualization: Using block diagram representation to model sub-systems and complete control architectures.Procedural Problem Solving: Mastering block diagram algebra for system reduction and simplification.Application-Based Learning:

	Analyzing real-world actuators like DC motors and hydraulic systems to bridge theoretical concepts with physical steady-state operation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	A\1 B\1 C\4	General introduction on the subject of control & measurements in different branches of engineering., mech. Elect. Chem. Civil prod. ..etc	lectures	Quiz
3-4	4		Basic requirements for the subject and the connection between control and measurements (measurements here means sensors) giving some example& the contents of the subject.	lectures	Quiz
5-6	4		Representation of control systems components, mechanical rotational, fluidic, thermal and electrical. First-order system and time constants for different sub-systems.		
7-8	4		Dynamic equations and block-diagram representation of some actuators normally used in control systems, hydraulic integrator and hydraulic actuator, field-controlled D.C motors and armature-controlled D.C motors.		
9-10	4		Linearization of non-linear relationships and why it is needed in control system representation. Hydraulic actuator with load as an example on linearization and other examples.		
11-12	4		Block diagram algebra and simplification rules, solving an example on simplification. Examples on complete control and building block diagrams with reference input and disturbances.		
13-15	6		Steady state operation and the evaluation of steady state block diagram constants. Steady s.		

			equation of operation, controller and system to be controlled characteristic curves.		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Automatic Control Engineering by Francis H. Raven, University of Notre Dame.
Primary references (sources)	Modern Control Engineering by K. Ogata, University of Minnesota.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Air Conditioning	
2. Course Code:	
ME403	
3. Semester / Year:	
Autumn /2025	
4. Description Preparation Date:	
10/9/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 hrs./ 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ziad Mohammed Majeed Email: ziadalmakhyoul@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Describing the air conditioning systems. • knowing the properties of air. • Knowing the ducting design. • Understand the air conditioning cycles. • Understand how to calculating the cooling load. • Understanding the air mixing. • Knowing the air conditioning process and applications.
9. Teaching and Learning Strategies	

Strategy	This course concerns with the study the properties of air and methods of measuring it. This course also including air conditioning systems, defining air conditioning, moist air properties, psychrometric chart, calculating moist air properties based on perfect gas formulations, Human thermal comfort, selecting indoor and outdoor design conditions, Psychrometry and psychrometric basic processes, sensible and latent heat, air mixing and basic air conditioning cycles, Heat transfer through building envelope, Ventilation and infiltration, ducting system,

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	A\1, A\2 B\4 C\1	Introduction + Properties of moist air(dry bulb temperature , wet bulb temperature, Enthalpy and specific volume) and Psychrometer	lectures	Quiz
3-4	6		Measuring and selecting factors involved in determination of thermal comfort condition, globe temperature, operative temperature, mean radiant temperature, predicted mean vote index, adjustment of operative temperature, estimating clothing insulation and activity level, outdoor design conditions, thermal comfort chart.	lectures	Quiz
5-6	6		Psychrometric chart, calculating moist air properties by psychrometric chart and by perfect gas law formulations, energy analysis in any AC process.	lectures	Quiz + Homework
7-8	6		The A/C processes, Room sensible heat line,Heating/ Cooling A/C cycles including:- 100% return air A/C cycle, 100% fresh air A/C cycle, Mixing return and fresh air A/C cycle	lectures	Exam
8-9	6		Refrigerants and effect it's on environment	lectures	Quiz
10-12	9		Heating and Cooling Load Calculations, (Proper selection of indoor air conditions & outdoor conditions, internal and externalair conditioning load sources, heating load, cooling load by CLTD method.	lectures	Homework

13-15	9		Types of ducting system, pressure drop and friction factor, method of calculatingdimensions of ducting system.	lectures	Quiz

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)	Fay.C. Mc. Quiston, Jerald D. Parker, "Heating, Ventilating, and Air Conditioning", 4thed., John Wiley & Sons, Inc., New York, 1994.
Main references (sources)	W.P. Jones, "Air Conditioning Engineering", 2nd Edward Arnold, Bell and Bain Ltd, Glasgow, 1973.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Introdcution to Vibrations
2. Course Code:
ME404
3. Semester / Year:
Spring / 2026
4. Description Preparation Date:
2026 /04 /18
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)
Dr Ziad Shakeeb Al Sarraf ziadalsarraf@uomosul.edu.iq
8. Course Objectives
Upon successful completion of this course, students will be able to 1) Understand the vibration and its effects (advantages and disadvantages) on the human body and machines. 2) Recognize the vibratory systems (components and physical effects). 3) Determine the degrees of freedom and generalized coordinates. 4) Derive the equation of motion using different methods (free body diagram, energy, and equivalent methods) and calculate: A) Natural frequency of the system, B) Dynamic behavior based on initial conditions.
9. Teaching and Learning Strategies

▪ Exams ▪ Participations	▪ Letures ▪ Homeworks ▪ Reports

10. Course Structure

Evaluation	Learning method	Unit or subject name	Learning Outcomes	Hours	Week
• **Quizzes** • **Homeworks**		Briefly review the principles of dynamics. Basic definitions and concepts of mechanical vibration.	nowledge A\1 Skills B\4 valuations C\4	2	1
		Dynamic behavior of vibratory systems (periodic, non-periodic, and random motions). Classification of oscillation.		2	2
		Reduction of mechanical system vibration.		2	3
		Spring-mass system and pendulum.		2	4
		Degrees of freedom and generalized coordinates.		2	5
		The equivalent of spring, mass, and damper system.		2	6
		The equivalent of spring, mass, and damper system. Examples of real-world applications.		2	7
		Free un-damped vibration of a single degree of freedom system. Derive the equation of motion, calculate the natural frequency, and determine the dynamic behavior of the system based on initial conditions.		2	8
				2	9
		Free damped vibration of single degree of freedom system. (Viscous, coulomb, and hysteretic damping).		2	10
				2	11
				2	12
		Solved Problems		2	13
		Examination		2	14
		Course review		2	15

11. Course Evaluation

Home works	5 pt	1st term Exam	10 pt
Quizzes	10 pt	2nd term Exam	10 pt
Attendance	5 pt	Final Exam	60 pt

12. Learning and Teaching Resources

1- Engineering Vibrations, William J. Bottega, 2013, Taylor & Francis Group, LLC, USA. **2- □ Mechanical Vibrations, Singiresu, S. Rao, fourth (Revised), 2005, Prentice-Hall, NJ, USA.** **3- □ Mechanical vibrations, ANIL V. RAO, 2009, University of Florida, USA**	Required textbooks (methodolo if applicable)
	Main references (sources)
Follow Websites	Electronic references, websites

Course Description Form

1. Course Name:	
Engineering Materials 1	
2. Course Code:	
ME405	
3. Semester / Year:	
Autumn / 2025–2026	
4. Description Preparation Date:	
30/10/2025	
5. Available Attendance Forms:	
In-person (classroom attendance)	
6. Number of Credit Hours (Total) / Number of Units (Total):	
30 Hours / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Sabreen Ali Abed Email: sabreen.abed@uomousl.edu.iq	
8. Course Objectives	
Course Objectives	• Explain the applications of non-metallic materials such as ceramics, polymers, and rubber. • Describe standard specifications used in coding metallic alloys. • Compare composite materials with other non-metallic materials. • • Analyze nanotechnology techniques in materials and advanced applications.
9. Teaching and Learning Strategies	
Strategy	The primary strategy of this course is to enhance fourth-year students' understanding of engineering materials, including both metallic and non-metallic materials. The course encourages students to explore real-life applications of different materials and develop critical thinking skills for selecting suitable materials in engineering design. Students will also gain the ability to analyze industrial applications and make appropriate engineering decisions. The course is delivered through lectures, interactive discussions, and seminars.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	B\4 C\3	International Material Standards	lectures	Quiz
2–3	4		Corrosion Principles and Prevention Methods	lectures	Homwork 1
4-5	4		Engineering Polymers	lectures	quiz
6-7	4		Ceramics	lectures	Homwork 2
8	2		Composite Materials	lectures	Exam 1
9-10	4		Material Selection	lectures	Homwork 3
11	2		Powder Metallurgy	lectures	Report
12	2		Shape Memory Alloys	lectures	
13–14	4		Introduction to Nanotechnology	lectures	quiz
15	2		Course Review	lectures	Exam 2

11. Course Evaluation

Task	Weight (Marks)
Homework	10 %
Quizzes	10%
Problem-Based Learning Exam	5%
Report	5%
Midterm Exam	10%
Total	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	*Fundamentals of Materials Science and Engineering*, William D. Callister, 4th ed., John Wiley & 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	*Technology of Engineering Materials*, Philip & W. Bolton, BH, 2002, London

Course Description Form

1. Course Name:
Power plant (2)
2. Course Code:
ME406
3. Semester / Year:
Autum /2025-2026
4. Description Preparation Date:
16/9/2025
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total):
2 / 30
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar Younis Ibrahim Email: drammar2020@uomosul.edu.iq
8. Course Objectives

Course Objectives		Understand classification and environmental impacts of power plants. • Design Rankine and combined cycles. • Operate boilers, condensers, hydro plants. • Improve Rankine performance. • Classify binary and gas turbine combined cycles.
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	4	A\2 B\2 C\2	Understand classification and environmental impacts of power plants.	lectures	Quiz
3-4	4		Understand classification and environmental impacts of power plants.	lectures	Quiz
5	2		• Design Rankine and combined cycles		
6	2		• Design Rankine and combined cycles.		
7-8	4		• Operate boilers, condensers, hydro plants.		
9-10	4		• Operate boilers, condensers, hydro plants.		
11	2		• Operate boilers, condensers, hydro plants.		
12-13	4		• Operate boilers, condensers, hydro plants.		
14-15	4		• Operate boilers, condensers, hydro plants.		

11. Course Evaluation

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

12. Learning and Teaching Resources

	Power Plant Engineering, P.K. Nag, McGraw Hill, 2008	
	• Thermodynamics: An Engineering Approach, Yunus A. Cengel & Michael A. Boles, 5th Ed.	
	• Boiler Operation Engineering: Questions and Answers, P. Chattopadhyay, 2nd Ed.	
	• Power Plant System Design, Li W., Priddy P., Wiley, 1985	

Course Description Form

1. Course Name:	
Electric Machines	
2. Course Code:	
ME407	
3. Semester / Year:	
Fall /2025-2026	
4. Description Preparation Date:	
09/09/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
60 Hours /3 Units	
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	• To provide a thorough basis for studying electrical machines. Introduce electric and magnetic fields' main parameters and properties at low frequencies. • To introduce the concept of magnetic circuits and transformers' operational principles and characteristics. • To introduce students to the basics of electrical machine construction and the structure and operational principles of DC machines. • To introduce students to the basics of electrical machine construction and the structure and operational principles of induction machines. • To introduce students to the basics of electrical machine construction and the structure and operational principles of synchronous machines. • Decide on strategies to be used and assumptions that need to be made. • Develop a flexible and creative problem-solving ability. • Develop their ability to communicate ideas of science. Develop an expertise in experimental methodologies.
9. Teaching and Learning Strategies	
Strategy	The primary strategy of this course is to encourage students' participation in discussions and to solve the exercises. They also refine and expand their critical thinking skills to design machines' system components. This strategy is achieved through classes, interactive tutorials, hands-on computer-based problems, and by considering real applications that are interesting to the students.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	A\1,A\3 Knowledge B\1 Skills C\3 Ethics	Electrical machine (magnetic field, faraday & Lenzes laws)	lectures	Quiz
2	4		D.C machines and DC generator's main principles.	lectures	Quiz
3	4		D.C motors principles, types, and speed control methods.		
4	4		A.C machines / Electrical transformers & their test methods		
5	4		Equivalent circuit of single-phase transformers		
6	4		3-phase transformers and Automatic voltage regulator		
7	4		Induction machines & generators.		
8	4		Single-phase induction motor Three-phase induction motor and Starter circuit connection to start 3-phase induction motor		
9	4		D.C motors principles, types, and speed control methods.		
10	4		Delta –star staring connection of 3-phase induction and Reversal of rotation direction of 3-phase. Speed control methods		
11	4		Equivalent circuit of single-phase transformers		
12	4		3-phase transformers and Automatic voltage regulator		
13	4		synchronous motor and the starting methods		
14	4		Synchronous generator principles		
15	4		Synchronous generators' synchronization terms		

11.Course Evaluation

Homework	5 point
Quizzes	10 point
Projects	10 point
Midterm Exam	25 point
Final	50 points
Total	100 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	SHIGLEY J. E., 2020. Mechanical Engineering Design 8th Edition: McGraw-Hill.
Primary references (sources)	DIETER, G, E. and SHHMIDT, L, C; 2009. Engineering Design. 4th ed. New York: McGraw-Hill.
Recommended books and references (scientific journals, reports)	

Course Description Form

1. Course Name:	
Machine Design System 2	
2. Course Code:	
ME451	
3. Semester / Year:	
spring /2026	
4. Description Preparation Date:	
25/1/2026	
5. Available Attendance Forms:	
Attenance	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2 / 30	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Alaa D. Younis Email: alaayonis@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Analyze material failure modes and establish various stresses and failure theories on static and dynamic loading CO-2 • Analyze high, low cycle fatigue and interpretation of data by combined loading CO-3 • Design and predict the fracture strength of mechanical components CO-4 • Design mechanical components involving contacts avoiding the surface failures.
9. Teaching and Learning Strategies	
Strategy	An introduction to clutches, their purpose, how they work, in general and, developing a mathematical set of equations to calculate the outline dimensions of a friction type of clutches, whether they are of single disk or multiple disk clutch type. Introduction to brakes, their purpose, and how they work. The development of mathematical set of equations to calculate the outline dimensions of a friction type of brakes and their torque capacity, whether they are of internal or external drum brakes. Introduction to Gears, which include the classifications of gears, Gear theory, Gear ratio. Design aspects of gears using Lewis's formula for bending stress and Hertz theory for contact stress. Design aspects using AGMA design formulas for bending and contact stresses. Design of power screws.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	A2 B1 C3	**Fluid Power (Hydraulic)** Tutorial Sheet No.1	lectures	Quiz
4-8	10		**Fluid Power (pneumatic)** Tutorial Sheet No.2	lectures	Quiz
9-10	4		**Welding**. Tutorial Sheet No.3	lectures	Quiz +
11-13	6		**Revit** Tutorial Sheet No.4	lectures	Exam
14-15	4		**Review of course subjects**	lectures	Exam

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)	Machine Elements in Mechanical Design, 6th edition. Robert L. Mott, Edward M. Vavrek and Jyhwen Wang, Pearson Prentice Hall. 2018.
Main references (sources)	Shigley's Mechanical Engineering Design, 10th edition. R Budynas and J. K. Nisbett. 2015
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Control and measurements II	
2. Course Code:	
ME452	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
1/2/2026	
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: Khalid Elias Hammo Email: khalid1974@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Performance specification of second order system. • Understanding of input function (or signal) normally used in control systems, and their Laplace transform. • Determination of system response to specific input functions, and poles and zeros of systems. • Examining system stability via its characteristic equation • Understanding root-locus methods • Understanding the main components for a measuring device (or sensor).
9. Teaching and Learning Strategies	
Strategy	The primary strategy for delivering this module involves integrating theoretical control principles with hands-on measurement techniques. This will be accomplished through interactive lectures and practical workshops focusing on system dynamics and instrumentation. Students will be encouraged to participate in laboratory experiments to evaluate sensor performance and feedback loops, allowing them to bridge the gap between mathematical models and physical hardware. The approach aims to refine their ability to analyze system stability and enhance their technical skills in designing and troubleshooting measurement and control circuits.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	A\1 B\1 C\4	Introduction to analysis and design of control systems.	lectures	Quiz
3-4	4		Laplace Transformation and type of input signals.	lectures	Quiz
5-6	4		Tutorial sheet No.1		
7	2		Types of roots		
8	2		Tutorial sheet No.2		
9	2		Transient response, Distinct and repeated roots		
10	2		Transient response, Complex conjugate roots.		
11-12	4		Steady – state errors and Transient response specifications		
13	2		Stability		
14-15	4		Root Locus		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Automatic Control Engineering by Francis H. Raven, University of Notre Dame.
Primary references (sources)	Modern Control Engineering by K. Ogata, University of Minnesota.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Refrigeration	
2. Course Code:	
ME453	
3. Semester / Year:	
Spring /2026	
4. Description Preparation Date:	
7/2/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 hrs. / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ziad Mohammed Majeed Email: ziadalmakhyoul@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Describing the vapor compression cycle. • Knowing the Multi-stage compressors and applications. • Knowing the basic thermodynamics for cycles. • Understand the types of refrigerants. • Understand the (Ton) of refrigeration. • Understanding the type of compressors. • Knowing the applications of absorption systems.
9. Teaching and Learning Strategies	
Strategy	This course represents the details of refrigeration system components and also including defining the refrigeration, principle of obtaining refrigeration effect, Vapor Compression cycles refrigeration, Multi-stage compressors, basic and auxiliary components of refrigeration system, absorption system and types of refrigerants and designations it.
10. Course Structure	

Week	Hours	Required Learning Outcome	Unit or subject name	Learning method	Evaluation
1-2	6	A\1, A\2 B\4 C\1	Defining refrigeration, classification of methods of obtaining refrigeration effect, practical methods	lectures	Quiz
3-5	9		Reversed Carnot cycle, Coefficient of performance (COP), drawbacks of Carnot cycle, Reversed Rankin cycle (basic refrigeration cycle), and methods of improving performance of vapor compression cycle.	lectures	Quiz
6-7	6		Multi- evaporators, Multi-compressors with inter-cooling, Cascade cycles.	lectures	Quiz + Homework
7-8	6		Refrigerants and effect it's on environment	lectures	Quiz
9-10	6		Type of Compressors	lectures	Exam
11-12	6		Refrigerants, Designate of refrigerants and the ethical in engineering applications	lectures	Homework
13-15	96		Absorption systems: Aqua-Ammonia system, Lithium bromide system	lectures	Quiz

11.Course Evaluation

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)	Fay.C. Mc. Quiston, Jerald D. Parker, "Heating, Ventilating, and Air Conditioning", 4thed., John Wiley & Sons, Inc., New York, 1994.
Main references (sources)	W.P. Jones, "Air Conditioning Engineering", 2nd Edward Arnold, Bell and Bain Ltd, Glasgow, 1973.

Course Description Form

1. Course Name:	
VIBRATION	
2. Course Code:	
ME454	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
5/1/2026	
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	Lecturer: Bakr Noori Alhasan Email: bakralhasan@uomosul.edu.iq
8. Course Objectives	
Course Objectives	This course provides the dynamic behavior of vibratory systems under deterministic and random motions. The degrees of freedom and generalized coordinates are taught. Different types of vibratory systems are classified and illustrated as: Multi-degree of freedom systems. Stability of the vibratory systems. Vibration measuring instruments. Vibration isolation. Vibration control. The mathematical models of the physical systems are explained, and the dynamic behavior of the vibratory systems based on initial conditions is analyzed analytically. Newton's law, energy, and equivalent methods are used for fully solved examples, emphasizing real-world applications. 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: 20. Describing the degrees of freedom and generalized coordinates . 21. Using different methods to derive EOM of multi-degree of freedom systems. 22. Explaining the dynamic response of the systems. 23. Understand vibration measuring instruments . 24. Inspect the stability of mechanical systems. 25. Outlining suitable isolation parts to reduce the effect of vibrations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A/2 B/1	Review the behavior of vibratory systems under external excitation	lectures	Quiz
2-3	4		Vibration under general forcing conditions	lectures	Homework#1
4-5	4		Free un-damped vibration of 2DOF system. Derive EOM of system based on initial conditions.	lectures	Quiz
6-7	4		Free damped vibration of 2DOF system.	lectures	Homework#2
8	2		Forced un-damped vibration of 2DOF systems	lectures	Quiz
9-10	4		Forced damped vibration of 2DOF systems	lectures	Homework#3
11	2		Understand vibration measuring instruments	lectures	report
12	2		Vibration control.	lectures	
13-14	4		Vibration isolation.	lecture	Quiz
15	2		Course review		Exam#2

11. Course Evaluation

Homework	10 point
Quiz	10 point
Report	5 point
Problem-Based Learning exam	5 point
Term Exam	10 point
Final	40 points

12. Learning and Teaching Resources

Required textbooks (curricular books, if any):	Mechanical Vibrations, Singiresu, S. Rao, fourth (Revised), 2005, Prentice-Hall, NJ, USA
Primary references (sources):	Engineering Vibrations, William J. Bottega, 2013, Taylor & Francis Group, LLC, USA.
Recommended books and references (scientific journals, reports...)	Online

Course Description Form

1. Course Name:	
Engineering materials-2	
2. Course Code:	
ME455	
3. Semester / Year:	
Spring /2025-2026	
4. Description Preparation Date:	
1/2/2026	
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)	
Lecturer: Asst. Prof. Dr. Anas Obeed Balod Email: anasbalod@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Engineering materials is a branch of production engineering that deals with the behavior of materials. An Engineering Materials course aims to provide a fundamental understanding of the relationship between a material's internal structure (atomic/microstructure), its processing, and its resulting properties (mechanical, electrical, thermal). Key objectives include identifying metallic material types (steel, Aluminum, Copper, Ni), understanding failure mechanisms, and selecting materials for specific engineering applications
9. Teaching and Learning Strategies	
Strategy	The course contributes to the following student outcomes: • **Structure-Property-Processing Relationships:** Understand how atomic bonding, crystal structures, imperfections, and microstructure determine the engineering properties of materials. • **Material Properties and Characterization:** Gain knowledge of mechanical properties (hardness, stress, strain, yield, ductility, toughness) and testing procedures (fatigue, creep, tensile tests). • **Materials Classification and Selection:** Identify and differentiate between types of materials (metals, ceramics, polymers, composites) and their specific applications. • **Processing and Phase Transformations:** Understand phase diagrams, diffusion, and heat treatments to modify material microstructure for desired properties. • **Failure Analysis:** Analyze mechanisms of fracture, corrosion, and degradation to predict material behavior in design applications.

	• **Engineering Application and Ethics:** Apply knowledge of materials to real-world design problems, considering sustainability, safety, and ethical implications.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	B\4 Skills C\3 Ethics	Solid solution Binary diagram	lectures	HW1
3-5	6		Eutectic binary diagram	lectures	HW2
6-8	6		Partially Eutectic binary diagram	lectures	HW3
9	2		Intermetallic mix diagram	lectures	HW4
10	2		Review binary diagram		Quiz
11-12	4		Solid solution ternary diagram	lectures	HW5
13-14	4		Eutectic ternary diagram	lectures	
15	2		Partially Eutectic ternary diagram		HW6

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):	Fundamentals of material science and engineering", William.d.callister, 4th ed., John weily &sons, 2012, U.S.A
Primary references (sources):	Material science, R.S.Khurmi, R.S.Sedha, Ram Najar, New Delhi, 1987.
Recommended books and references (scientific journals, reports)	Fundamentals of material science engineering", William.d.callister, 4th John weily &sons, 2012, U.S.A
Electronic References: https://classroom.google.com **Class code:**	https://classroom.google.com p77tg5c4

Course Description Form

1. Course Name:
Power plant (2)
2. Course Code:
ME456
3. Semester / Year:
Spring /2025-2026
4. Description Preparation Date:
16/1/2026
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total):
2 / 30
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar Younis Ibrahim Email: drammar2020@uomosul.edu.iq
8. Course Objectives

Course Objectives	Understand classification and environmental impacts of power plants. • Design Rankine and combined cycles. • Operate boilers, condensers, hydro plants. • Improve Rankine performance. • Classify binary and gas turbine combined cycles.
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	4	A\2 B\2 C\2	Understand classification and environmental impacts of power plants.	lectures	Quiz
3-4	4		• Design Rankine and combined cycles.	lectures	Quiz
5	2		• Design Rankine and combined cycles.		
6	2		• Operate boilers, condensers, hydro plants.		
7-8	4		• Operate boilers, condensers, hydro plants.		
9-10	4		• Improve Rankine performance		
11	2		• Improve Rankine performance.		
12-13	4		• Classify binary and gas turbine combined cycles.		
14	2		• Classify binary and gas turbine combined cycles		

11. Course Evaluation

Task	Weight (Marks)
Homework	%10
Quizzes	%10
Projects	%15
Report	%15
Midterm Exam	%50
Total	%100

12. Learning and Teaching Resources

Power Plant Engineering, P.K. Nag, McGraw Hill, 2008	
• Thermodynamics: An Engineering Approach, Yunus A. Cengel & Michael A. Boles, 5th Ed.	
• Boiler Operation Engineering: Questions and Answers, P. Chattopadhyay, 2nd Ed.	
• Power Plant System Design, Li W., Priddy P., Wiley, 1985	

Course Description Form

1. Course Name:	
Laboratories III	
2. Course Code:	
ME459	
3. Semester / Year:	
Spring /2024-2025	
4. Description Preparation Date:	
5/1/2026	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 / 1	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mahmoud U Jasim (supervisor) Email: mahmood14@uomosul.edu.iq Dr. Omar Salah- Al-Dean omerphd18@uomosul.edu.iq Yousif Salim Mahmoud yousif.alhadidi@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The main objective of this course is to expose students to experimental equipment, data collection, and reporting which would support the theoretical background obtained in the studied topics. Students who study the course entitled "MEC452 – Laboratories III" will be able to 1- Learn how to gain knowledge by looking at reality, not an attempt to make reality conform to preconceptions. The important thing is to learn how to be observant, to really see what happens, and to deal with this information with the strictest integrity. And to understand, or learn to understand, the meaning of what happens. 2- Gain an experimental foundation for the theoretical concepts introduced in the lectures. It is important that students have an opportunity to verify some of the ideas for themselves. 3- Familiarize with experimental apparatus, the scientific method, so that hewill have some idea of the inductive process by which the ideas were originated. 4- The students will learn how to collaborate to complete each experiment correctly. 5- Teach how to make careful experimental observations and how to think about and draw conclusions from such data. 6- Learn how to write a technical report which communicates scientific information in a clear and concise manner.

9. Teaching and Learning Strategies	
Strategy	• The students should carefully read the instruction sheet of the experiment he going to perform in the lab. Before attending the lab. • In the lab the instructor ask each student in the group two or three questions about the experiment to be done by them. • Under the supervision of the instructor the students operate the experiment device and the needed readings according to the instruction sheet. • The students then after end taking the readings have to do example of the calculation based on their knowledge and by the help of the instruction sheet. Each student should prepare a report about the done experiment.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	B\1 B\2 B\3	Registration period		
2	3		Introduction, Dividing Students into Groups	lecture	
3	3		**Control laboratory** Types of non-return valve used in pneumatic control circuits	Lab. work	Report
4	3		**Control laboratory** Articulated arm robot	Lab. work	Report
5	3		**Air conditioning laboratory** Application of different air conditioning processes	Lab. work	Report
6	3		**Air conditioning laboratory** Experimental calculation of COP of a refrigeration cycle.	Lab. work	Report
7	3		**Make-up week** Allow any group to do any undone experiments because of technical reasonses.	Lab. work	Report
8	3		**Renewable energy laboratory** Flat Plate active Solar Water heating system	Lab. work	Report
9	3		**Renewable energy laboratory** Photovoltaic power generating unit	Lab. work	Report
10	3		**Vibration lab Vibration laboratory** Force vibration of rigid body – spring system with negligible damping oratory	Lab. work	Report
11	3		**Metalurgy laboratory** Ultrasonic testing	Lab. work	Report
12	3		**Make-up week** Allow any group to do any undone experiments because of technical reasonses	Lab. work	Report
13-14	6		Mid-semester exam		Exam
15	3		Final exam		Exam

11. Course Evaluation

Task	Weight (Marks)

8 Reports (one on each experiment)	25 point
Problem-Based Learning exam	5 point
Semi-Final Exam	20 point
Total	50 points

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any):	Instruction sheet for each experiment
Primary references (sources):	
Recommended books and references (scientific journals, reports...)	Online

Course Description Form

1. Course Name:	
Computer Aided Thermal System Design	
2. Course Code:	
ME460	
3. Semester / Year:	
Spring semester/2025-2026	
4. Description Preparation Date:	
15/9/2025	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total):	
45 Hours / 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name	Email
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8. Course Objectives	
Course Objectives	• Identify thermal systems (their components and physical effects). • Analyze thermal systems. • Simulate thermal systems—such as buildings—using DesignBuilder software and interpret the results. • Estimate cooling and heating loads of buildings, as well as energy consumption.
9. Teaching and Learning Strategies	
Strategy	The primary instructional strategy for this course is based on interactive learning through discussions, in-class exercises, and practical applications using computers and presentation software, with the aim of developing students' critical thinking skills and applying the concepts to the design of thermal system components, particularly in buildings.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	A\2 Knowledge B\1 Skills C\3 Ethics	A brief review of thermal systems, their basic definitions, concepts, and related terminology. Introducing DesignBuilder software as a simulation tool and explaining how to use it.	lectures	• In-Class Activities • HW • Exams
2	3		Implement the first tutorial step by step to demonstrate how to use the DesignBuilder environment for system simulation. Demonstrate how to extract and interpret results in the form of plots, tables, or graphs.		
3	3		Implement the second tutorial interactively with the students to help build their confidence in completing similar tasks, with a focus on creating and simulating a single-zone building model using DesignBuilder.		
4	3		Work with the students on the third tutorial in an interactive way to strengthen their skills, by building a single-zone model in DesignBuilder and studying how the building's orientation affects energy use and indoor conditions.		
5	3		The fourth tutorial focuses on assessing how opaque envelope components, such as the external walls and roof, affect building performance.		
6	3		Guide the students through the fifth tutorial to strengthen their practical skills by modeling a multi-zone building in DesignBuilder and analyzing how different Window-to-Wall Ratios (WWR) influence energy use and indoor comfort.		
7	3		Midterm Exam		
8	3		Conduct the sixth tutorial with the students to strengthen their analytical skills by investigating the impact of different space activities and usage patterns on a building's energy consumption and thermal comfort using DesignBuilder.		
9	3		In the seventh tutorial, students work independently to complete the exercise on their own.		
10	3		The eighth tutorial focuses on assessing how the coefficient of performance (COP) of a unitary air-conditioner affects the overall energy efficiency of a building.		
11	3		Assign a project to each student that requires developing and analyzing an individual building model using DesignBuilder, focusing on evaluating energy performance and suggesting design improvements for enhanced efficiency and comfort.		
12	3		The ninth tutorial focuses on evaluating how the fan efficiency of a unitary air-conditioning system affects the building's energy performance.		

13	3		The tenth tutorial aims to analyze and compare the energy consumption of different HVAC system types.		
14	3		The eleventh tutorial is intended to analyze how roof insulation affects a building's overall energy consumption.		
15	3		A course review.		

11.Course Evaluation

Task	Weight (Marks)
Homework	10 points
In-Class Activities	10 points
Project	10 points
Midterm Exam	20 points
Final	50 points
Total	100 points

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	The Official Guide for DesignBuilder Software.
Primary references (sources)	
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	https://designbuilder.co.uk/helpv7.0/Content/HelpTutorials.htm