Course Description Form

1. Course Name:	
Fluid Mechanics-I	
2. Course Code:	
MEC 005	
3. Semester / Year:	
1st / 2024-2025	
4. Description Preparation Date:	
16/9/2024	
5. Available Attendance Forms:	
In-person lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Credit Hours (100, 78 SSWL + 22 USSWL) / Number of Units (4)	
7. Course administrator's name (mention all, if more than one name)	
Prof. Dr. Waleed Mohammed Abed **Email: waleed_eng76@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	✓ To explain and calculate the key fluid properties that relevant w the topics of fluid mechanics; ✓ To evaluate hydrostatic forces on submerged planar and cur surfaces, and fluids in rigid-body motion; ✓ To derive the main relations of conservation laws; ✓ To derive and interpret the mass, Bernoulli, momentum analysis flow systems and energy equation; ✓ To calculate the transfer and extract of mechanical energy systems containing pumps and turbines; ✓ To apply the dimensional analysis on the fluid mechanics issues.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to: 1. Encourage students' participation in the exercises 2. Refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	**5**	To know and comprehend the definitions of fundamental concepts of Fluid Mechanics.	Introductory Concepts of Fluid Mechanics	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
2	**5**	To understand and apply the physical properties of Fluid including: continuum, density, specific weight, viscosity, surface tension and capillary effect.	Thermodynamic Properties of Fluid	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
3	**5**	To understand and apply the physical properties of Fluid including: continuum, density, specific weight, viscosity, surface tension and capillary effect.	Surface Tension and Capillary Effect	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
4	**5**	To understand the basic equations of static fluid and derive the equation of pressure distribution for incompressible fluids.	Pressure Distribution in a Fluid	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
5	**5**	To know the working principle of manometers such as, U-Tube and inclined manometer.	Pressure Measurements	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
6	**5**	To understand and demonstrate the application point of hydrostatic forces on submerged planar and curved surfaces.	Hydrostatic Forces on Submerged Plane Surfaces	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
7	**5**	To understand and demonstrate the application point of hydrostatic forces on submerged planar and curved surfaces.	Hydrostatic forces on submerged curved surfaces	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
8	**5**	To understand and realize the fluid motion as a rigid-body in both cases: liquid in rigid-body motion with linear acceleration and liquid in rigid-body motion with constant angular speed.	Fluids in rigid-body motion and Rotation in a Cylindrical Container	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
9	**5**	To understand the main concepts of system and control volume and their applications (conservation laws), and describe the principles of motion for fluids.	Fluid Flow Concepts (Definitions and Concepts)	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
10	**5**	To understand the main concepts of system and control volume and their applications (conservation laws), and describe the principles of motion for fluids.	System and control volume of Fluid Flow	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
11	**5**	To understand and identify how to derive basic equations and know the related assumptions and apply the equation of the conservation of mass, the equation of the conservation of momentum.	The Bernoulli equation	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
12	**5**	To understand the equation of the conservation of energy and Bernoulli equation, and identify transfer and extract of mechanical	Applications of Bernoulli equation and mechanical energy and efficiency	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams

		energy and solve their relevant problems that contain pumps and turbines.			
13	**5**	To understand the concepts of dimensional analysis and apply The Buckingham Pi-Theorem, and derive the dimensionless numbers.	Dimensional analysis and similarity	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
14	**5**	To understand the concepts of dimensional analysis and apply The Buckingham Pi-Theorem, and derive the dimensionless numbers.	Buckingham theorem	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
15	**5**	To know and apply the similarity concept and set up the relation between a model and a prototype.	Physical Modeling (Geometric, Kinematic and Dynamic Similarities)	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams

11. Course Evaluation

Quizzes (20%), Assignments (10%), Reports/ Lab. (10%), Midterm Exam (10%), Final Exam (50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Frank M. White, "Fluid Mechanics", WCB McGraw-Hill series in mechanical engineering, Fourth Edition, 2012. 2. Yunus A. Çengel and John M. Cimbala, "Fluid Mechanics: Fundamentals and Applications", McGraw-Hill series in mechanical engineering, First Edition, 2006.
Main references (sources)	1. Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, and Wade W. Huebsch, "Fundamentals of Fluid Mechanics", John Wiley & Sons, 6th Edition, 2009. 2. Victor L. Streeter, E. Benjamin Wylie, Keith W. Bedford, "Fluid Mechanics", McGraw-Hill, 9th Edition, 2002.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:	
Fluid Mechanics-II	
2. Course Code:	
MEC 009	
3. Semester / Year:	
2nd / 2024-2025	
4. Description Preparation Date:	
19/1/2025	
5. Available Attendance Forms:	
In-person lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Credit Hours (100, 78 SSWL + 22 USSWL) / Number of Units (4)	
7. Course administrator's name (mention all, if more than one name)	
Prof. Dr. Waleed Mohammed Abed **Email: waleed_eng76@uoanbar.edu.iq**	
8. Course Objectives	
Course Objectives	✓ To explain the main concepts of viscous internal laminar and turbulent flows (through pipes and ducts); ✓ To evaluate the pressure drop and pumping power for the viscous laminar and turbulent flow through pipes and ducts; ✓ To quantify the major (friction) and minor (fittings and components) losses of flow in piping system; ✓ To compute the useful pump head delivered to the fluid and the turbine head extracted from the fluid for the piping networks connected to each other in series and/or in parallel; ✓ To describe the measurement instruments of flow rate and velocity and do the calculations. ✓ To select pump characteristics and system characteristics to determine the operation point.
9. Teaching and Learning Strategies	
Strategy	Introduce students to the flow regimes (laminar, transition and turbulent) and pressure drop and pumping power for the viscous flow through pipes and ducts. Provide them with the opportunity to develop useful skills at predicting the useful pump head delivered to the fluid and the turbine head extracted from the fluid for t piping networks and determine the measurement instruments of flow rate and velocity. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**5**	To understand the main concepts of viscous internal laminar flow	Laminar flow in pipes	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
2	**5**	To understand and realize the Reynolds-Number Regimes (laminar, transition and turbulent) as well as the hydraulic diameter for non-circular channels and ducts	Analysis of Laminar flow in pipes	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
3	**5**	To know the pressure drop and pumping power for the viscous laminar flow through pipes and ducts	Pressure drop and head loss of laminar flow	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
4	**5**	To understand the main concepts of viscous internal turbulent flow	Turbulent flow in pipes	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
5	**5**	To understand the main concepts of viscous internal turbulent flow	Analysis of Turbulent flow in pipes	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
6	**5**	To comprehend the pressure drop (the Moody chart) and pumping power for the viscous turbulent flow through pipes and ducts	The Colebrook equation and the Moody Chart of friction factor	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
7	**5**	To understand the major friction losses of flow in pipes and ducts	Types of fluid flow problems	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
8	**5**	To understand the useful pump head delivered to the fluid and the turbine head extracted from the fluid for the piping networks	Piping Networks with Pumps and Turbines	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
9	**5**	To understand the minor (fittings and components) losses of flow in piping system (pipes and ducts)	The efficiency of the pump–motor combination	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
10	**5**	To understand the measurement instruments of flow rate and velocity	Flow rate and velocity measurements	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
11	**5**	To understand Pitot-static tubes of flow rate and velocity	Pitot-static tubes and its applications	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams

12	**5**	To understand Orifice, Venturi, and Nozzle meters of flow rate and velocity	Obstruction flowmeters: Orifice, Venturi, and Nozzle meters	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
13	**5**	To understand the concepts of turbomachinery-Pumps	The concepts of turbomachinery-Pumps	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
14	**5**	To know pump classifications and characteristics and system characteristics	Classification of pumps	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams
15	**5**	To know pump characteristics and system characteristics and the operation point	Pump Performance Curves and Matching a Pump to a Piping System	(Lectures + tutorials + Lab)	Quizzes, Assignments, Lab. Reports, Exams

11. Course Evaluation

Quizzes (20%), Assignments (10%), Reports/ Lab. (10%), Midterm Exam (10%), Final Exam (50%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Frank M. White, "Fluid Mechanics", WCB McGraw-Hill series in mechanical engineering, Fourth Edition, 2012. 2. Yunus A. Çengel and John M. Cimbala, "Fluid Mechanics: Fundamentals and Applications", McGraw-Hill series in mechanical engineering, First Edition, 2006.
Main references (sources)	1. Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, and Wade W. Huebsch, "Fundamentals of Fluid Mechanics", John Wiley & Sons, 6th Edition, 2009. 2. Victor L. Streeter, E. Benjamin Wylie, Keith W. Bedford, "Fluid Mechanics", McGraw-Hill, 9th Edition, 2002.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Heat Transfer-I

2. Course Code:

ME 3302

3. Semester / Year:

1st / 2024

4. Description Preparation Date:

22/9/2024

5. Available Attendance Forms:

In-person lectures

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

30Theoretical +15 Tutorial + 30 practical (75Hours) / 3 Credit Hours

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

Name: **Dr. Hamdi E. Ahmed**
Email: hamdi.ahmed@uoanbar.edu.iq

8. Course Objectives

Course Objectives	• Cover the basics of heat transfer mechanisms (conduction and radiation), in plane wall, cylinder and sphere bodies. • Discuss the heat transfer by conduction in solids for steady-state and transient conditions and heat conduction in extended surfaces (fines). • Illustrate heat transfer by thermal radiation. • Encourage students to link the theoretical studies of the heat transfer with the practical engineering applications. • Illustrate the variety of thermal applications available and clarify the need to continue learning

9. Teaching and Learning Strategies

Strategy	The main strategy is to encourage students' participation in the exercises, wh at the same time refining and expanding their critical thinking skills. This will achieved through classes, interactive tutorials and by considering type of sim experiments involving some sampling activities that are interesting to students at the lab.

10. Course Structure

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

1	**5**	To learn the basic of heat transfer	Basic and mechanism of heat transfer	(Lectures + tutorials + Lab)	Quiz Exam Report
2	**5**	To know how the heat is transferred in several geometries	Forms of heat transfer	(Lectures + tutorials + Lab)	Quiz Exam Report
3	**5**	To gain basic knowledge of terms of heat in multi-layer of thermal resistance	Multi- and one dimensional conduction heat transfer	(Lectures + tutorials + Lab)	Quiz Exam Report
4	**5**	To study the effect of surrounding conditions on heat trasnfer	BC and IC, and thermal resistance	(Lectures + tutorials + Lab)	Quiz Exam Report
5	**5**	Formulate and solve the governing equations including the heat generation term	Heat sources systems (heat generation)	(Lectures + tutorials + Lab)	Quiz Exam Report
6	**5**	Formulate and solve the governing equations in different geometries of extended surfaces	Heat transfer from fins, fin types, fin efficiency and fin effectiveness	(Lectures + tutorials + Lab)	Quiz Exam Report
7	**5**	Successfully practice the concepts of heat dissipation in several direction	Steady-state conduction multi-dimensions (nodal solution)	(Lectures + tutorials + Lab)	Quiz Exam Report
8	**5**	Derive the equations of temperature distribution	Numerical method for analysis	(Lectures + tutorials + Lab)	Quiz Exam Report
9	**5**	Formulate and solve equations of finite element methods and numerical methods	Unsteady-state heat conduction, Lumped heat capacity system	(Lectures + tutorials + Lab)	Quiz Exam Report
10	**5**	Derive and solve equations of heat varied with time	Transient numerical method	(Lectures + tutorials + Lab)	Quiz Exam Report
11	**5**	Derive and solve equations of heat varied with time in different shapes	Transient heat conduction in plane walls, cylinders, and spheres	(Lectures + tutorials + Lab)	Quiz Exam Report
12	**5**	Understand the concept of heat transfer by radiation	Radiation heat transfer, its properties, view factor	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**5**	Understand the concept of radiation heat transfer law	Kirchhoff's Law	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**5**	Understanding of radiation between different shapes of surfaces	Net Radiation Heat Transfer between Any Two Surfaces	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**5**	Understand the thermal resistance between radiant surfaces	Thermal resistance of radiation	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, Lab

=10%, and three-hour final course exam= 50%).

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ 1. J.P. Holman, "Heat Transfer", 9th Edition, 2013.
Main references (sources)	▪ 2. Yunus A. Cengel, "Heat Transfer, A Practical Approach", 2nd Edition, 2012. ▪ 3. F.P. Incropera, D.P. Dewitt, "Fundamentals of Heat and Mass Transfer", 2011.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Heat Transfer-II

2. Course Code:

ME3307

3. Semester / Year:

2nd / 2024

4. Description Preparation Date:

22/9/2024

5. Available Attendance Forms:

In-person lectures

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

30Theoretical +15 Tutorial + 30 practical (75Hours) / 3 Credit Hours

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

Name: **Dr. Hamdi E. Ahmed**
Email: **hamdi.ahmed@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	Heat Transfer II is a required module for mechanical engineer students. Forced convection heat transfer is studied in both inter and external geometries under laminar and turbulent flow regim Free convection is also considered where heat transfer is due to fl induced by fluid buoyancy.

9. Teaching and Learning Strategies

Strategy	The main strategy is to encourage students' participation in the exercises, wh at the same time refining and expanding their critical thinking skills. This will achieved through classes, interactive tutorials and by considering type of sim experiments involving some sampling activities that are interesting to students at the lab.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**5**	To learn the basic of heat transfer by convection	Physical Mechanism of Convection	(Lectures + tutorials + Lab)	Quiz Exam Report
2	**5**	To know the types and characteristics of flows	Classification of Fluid Flows	(Lectures + tutorials + Lab)	Quiz Exam Report
3	**5**	To gain basic knowledge of structure of temperature profile	Thermal Boundary Layer	(Lectures + tutorials + Lab)	Quiz Exam Report
4	**5**	To study the shape and characteristics of velocity	Hydraulic boundary layer	(Lectures + tutorials +	Quiz Exam

		profile		Lab)	Report
5	**5**	To understand how the heat is transferred when the fluid cover the solid body	External Forced Convection	(Lectures + tutorials + Lab)	Quiz Exam Report
6	**5**	Knowing the transfer of heat from plat body	Parallel Flow over Flat Plates	(Lectures + tutorials + Lab)	Quiz Exam Report
7	**5**	Knowing the transfer of heat from specific bodies	Flow across Cylinders and Spheres	(Lectures + tutorials + Lab)	Quiz Exam Report
8	**5**	Study of heat transfer from more complex bodies	Flow across Tube Banks	(Lectures + tutorials + Lab)	Quiz Exam Report
9	**5**	Understanding the basic of heat transfer when the body surrounds the fluid	Internal Forced Convection	(Lectures + tutorials + Lab)	Quiz Exam Report
10	**5**	Formulate and solve the governing equations of laminar flow	Laminar Flow in Tubes	(Lectures + tutorials + Lab)	Quiz Exam Report
11	**5**	Comprehension of the regions division in turbulent flow	The Entrance Region	(Lectures + tutorials + Lab)	Quiz Exam Report
12	**5**	Understand the concept of heat transfer in turbulence regime	Turbulent Flow in Tubes	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**5**	Understand the concept of natural convection from extended surfaces	Natural Convection from Finned Surfaces	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**5**	Understanding of natural convection inside a closed system	Natural Convection inside Enclosures	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**5**	Aware the heat transfer when both natural and forced convection is included	Combined Natural and Forced Convection	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, Lab =10%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if an	▪ J. P. Holman, "Heat Transfer", 9th Edition, 2013.
Main references (sources)	▪Yunus A. Cengel, "Heat Transfer, A Practical Approach", 2nd Edition, 2012. ▪F. P. Incropera & D. P. Dewitt, "Fundamentals of Heat and Mass Transfer", 2011.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Internal Combustion Engines
2. Course Code:
ME 3304
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
22/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 Theoretical / 3 Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Ahmed Ali Najeeb** Email: **ashaab_1977@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• Teaching students how to classify engines and their components and calculate efficiency. • Study of standard air cycles and how to calculate workout and mean effective pressure and efficiency for each standard cycle. • Solve fuel-air and actual cycles and how to calculate their efficiency and apply them to the engines when the temperature is the specific heat as a function of temperature. • Study the chemical reactions and calculate the amount of heat produced by the combustion process. As well as calculating the air to fuel ratio (A/F). • Study fuels and know the properties of each fuel and the relationship between fuels.

9. Teaching and Learning Strategies	
Strategy	This course provides an introduction to I.C. ENGINS and Classify it . Air Standa cycles and Air fuel cycle with their analysis . In addition theoretical and experimental combustion analysis. Types of fuel .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	• Teaching students how to classify engines and their components and calculate efficiency..	**Engine Types and Their Operation, Engine Design and Operating Parameters.**	(Lectures + tutorials)	Quiz Exam
2	4	• Teaching students how to classify engines and their components and calculate efficiency.	**Engine Types and Their Operation, Engine Design and Operating Parameters.**	(Lectures + tutorials)	Quiz Exam
3	4	• Teaching students how to classify engines and their components and calculate efficiency..	**Engine Types and Their Operation, Engine Design and Operating Parameters.**	(Lectures + tutorials)	Quiz Exam
4	4	• Study of standard air cycles and how to calculate workout and mean effective pressure and efficiency for each standard cycle.	**Air standard Cycles.**	(Lectures + tutorials)	Quiz
5	4	• Study of standard air cycles and how to calculate workout and mean effective pressure and efficiency for each standard cycle.	**Air standard Cycles.**	(Lectures + tutorials)	Quiz
6	4	• Study of standard air cycles and how to calculate workout and mean effective pressure and efficiency for each standard cycle.	**Air standard Cycles.**	(Lectures + tutorials)	Quiz
7	4	• Solve fuel-air and actual cycles and how to calculate their efficiency and apply them to the engines when the temperature is the specific heat as a function of temperature.	**Fuel-Air Cycles, and Actual Cycles.**	(Lectures + tutorials)	Quiz Exam
8	4	• Solve fuel-air and actual cycles and how to calculate their efficiency and apply them to the engines when the temperature is the specific heat as a function of temperature.	**Fuel-Air Cycles, and Actual Cycles.**	(Lectures + tutorials)	Quiz Exam
9	4	• Solve fuel-air and actual cycles and how to calculate their efficiency and apply them to the engines when the temperature is the specific heat as a function of temperature.	**Fuel-Air Cycles, and Actual Cycles.**	(Lectures + tutorials)	Quiz Exam
10	4	Successfully practice the concepts of power transmission and steering gear mechanisms.	**Thermochemistry of Fuel-Air Mixtures.**	(Lectures + tutorials)	Quiz Exam

11	**4**	• Study the chemical reactions and calculate the amount of heat produced by the combustion process. As well as calculating the air to fuel ratio (A/F).	**Thermochemistry of Fuel-Air Mixtures.**	(Lectures + tutorials)	Quiz Exam
12	**4**	• Study the chemical reactions and calculate the amount of heat produced by the combustion process. As well as calculating the air to fuel ratio (A/F).	**Thermochemistry of Fuel-Air Mixtures.**	(Lectures + tutorials)	Quiz Exam
13	**4**	• Study fuels and know the properties of each fuel and the relationship between fuels.	**Fuel Types.**	(Lectures + tutorials)	Quiz
14	**4**	• Study fuels and know the properties of each fuel and the relationship between fuels.	**Fuel Types.**	(Lectures + tutorials)	Quiz
15	**4**	• Study fuels and know the properties of each fuel and the relationship between fuels.	**Fuel Types**	(Lectures + tutorials)	Quiz

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, , and three-hour final course exam= 60%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any) Main references (sources)	▪ Internal Combustion Engine Fundamentals by J.B. Heywood. ▪ Internal Combustion Engines by C.R. Ferguson. ▪ Introduction to I. C. Engines by Richard Stone
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Mechanical Drawing,

2. Course Code:

MEC 007

3. Semester / Year:

1st / 2024

4. Description Preparation Date:

22/9/2024

5. Available Attendance Forms:

In-person lectures

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

45Theoretical + 30 practical (75Hours) / 3 Credit Hours

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

Name: **Dr. Hamdi E. Ahmed**
Email: hamdi.ahmed@uoanbar.edu.iq

8. Course Objectives

Course Objectives	Mechanical drawing is the act and discipline of composing drawings that visually communicate how something functions or is constructed. It is essential for communicating ideas in industry and engineering. Together, such conventions constitute a visual language and help to ensure that the drawing is unambiguous and relatively easy to understand.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encour students' participation in the exercises, while at the same time refining a expanding their critical thinking skills. Also, encourage students to learn how identify the fastening of different mechanical parts by using various metho This will be achieved through classes, interactive tutorials and by consider type of simple experiments involving some sampling activities that interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	To learn the basic of mechanical drawing	Introduction to mechanical drawing	(Lectures + tutorials + Lab)	Quiz Exam Report

2	3	To know how the views and theirs sections	Representation of solid design-Sectional views	(Lectures + tutorials + Lab)	Quiz Exam Report
3	3	To know how the deducing the third view	Representation of solid design-Sectional views	(Lectures + tutorials + Lab)	Quiz Exam Report
4	3	To have a practice on how to draw the connecting tools	Nuts, bolts, screws	(Lectures + tutorials + Lab)	Quiz Exam Report
5	3	To have a practice on how to draw the connecting tools	Nuts, bolts, screws	(Lectures + tutorials + Lab)	Quiz Exam Report
6	3	To have a practice on how to draw the connecting tools	Keys and keyways	(Lectures + tutorials + Lab)	Quiz Exam Report
7	3	Study the methods of welding representation	Welding and welding symbols	(Lectures + tutorials + Lab)	Quiz Exam Report
8	3	Study the methods of welding representation	Welding and welding symbols	(Lectures + tutorials + Lab)	Quiz Exam Report
9	3	Study the methods of welding representation	Welding and welding symbols	(Lectures + tutorials + Lab)	Quiz Exam Report
10	3	Learn how to calculate the tolerance and clearance between matched parts	Tolerancing dimensions and fits	(Lectures + tutorials + Lab)	Quiz Exam Report
11	3	Learn how to calculate the tolerance and clearance between matched parts	Tolerancing dimensions and fits	(Lectures + tutorials + Lab)	Quiz Exam Report
12	3	Understand the methods of gears drawing	Gears	(Lectures + tutorials + Lab)	Quiz Exam Report
13	3	Have a practice of how to assemble multi parts in one drawing	assembly drawing	(Lectures + tutorials + Lab)	Quiz Exam Report
14	3	Have a practice of how to assemble multi parts in one drawing	assembly drawing	(Lectures + tutorials + Lab)	Quiz Exam Report
15	3	Have a practice of how to assemble multi parts in one drawing	assembly drawing	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation

Quizzes (10%), assignment (20%), lab (10%), Midterm (10%), and three-hour final course exam= 50%).

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ الرسم الهندسي عبدالرسول الخفاف .
Main references (sources)	▪ Colin H Simmons, Manual of Engineering Drawing Second edition. ▪ Dr. K.L. Narayana, Dr. P. Kannaiah and K.

	Venkata Reddy, Machine drawing Third
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Power Plants

2. Course Code:

ME 4303

3. Semester / Year:

2nd / 2024-2025

4. Description Preparation Date:

19/9/2024

5. Available Attendance Forms:

Physical Attendance

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

45 theoretical +15 Tutorial (60 Hours) / 3 Credit Hours

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

Name: **Dr. SAAD MOHAMMED JALIL**
Email: saad.jalil@uoanbar.edu.iq

8. Course Objectives

Course Objectives	1. To provide an overview on power generation through various methods. 2. To learn the layout of different conventional power plants. 3. To understand the various components, operations and applications of different types power plant. 4. To study the principles of the steam and gas turbines power plants. 5. To understand the working of diesel and gas turbine power plant 6. To create awareness about cost of electric energy, cost calculation and economics of various power plants.

9. Teaching and Learning Strategies

Strategy	This is a required course for Mechanical Engineering Program. The course will cover the basic principles of Power Engineering Technology. This course provides the student with an introduction to the major systems and components that make up a modern power plant.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Apply the basic concepts of thermodynamics to evaluate the efficiency of modern Rankine cycle	Introduction Of Thermodynamic	(Lectures + tutorials)	Quiz Exam Report

		steam power plants with the implementation of superheating, reheating, and regenerative	Cycles Used In Power Plants		
2	**4**	Apply the basic concepts of thermodynamics to evaluate the efficiency of modern Rankine cycle steam power plants with the implementation of superheating, reheating, and regenerative	Advanced Rankine Cycle (Reheating, Regenerative)	(Lectures + tutorials)	Quiz Exam Report
3	**4**	Apply the basic concepts of thermodynamics to evaluate the efficiency of modern Rankine cycle steam power plants with the implementation of superheating, reheating, and regenerative	Advanced Rankine Cycle (Reheating, Regenerative)	(Lectures + tutorials)	Quiz Exam Report
4	**4**	Apply the basic concepts of thermodynamics to evaluate the efficiency of modern Rankine cycle steam power plants with the implementation of superheating, reheating, and regenerative	Steam Generators, Steam Condensers, Steam Turbines	(Lectures + tutorials)	Quiz Exam Report
5	**4**	Identifying the performance of gas turbines with modern enhancing efficiency methods including intercooling, reheating, and heat exchanger	Introduction To Gas Turbine Power Plants	(Lectures + tutorials)	Quiz Exam Report
6	**4**	Identifying the performance of gas turbines with modern enhancing efficiency methods including intercooling, reheating, and heat exchanger	Modification Of The Basic Cycle (Intercooling & Reheating)	(Lectures + tutorials)	Quiz Exam Report
7	**4**	Identifying the performance of gas turbines with modern enhancing efficiency methods including intercooling, reheating, and heat exchanger	Modification Of The Basic Cycle (Regeneration)	(Lectures + tutorials)	Quiz Exam Report
8	**4**	Analyzes the combined cycle plant, the energy and mass balance equations are used to analyze the irreversible Brayton and Rankine cycles, with air and water/steam as the working fluids respectively	Combined Cycles	(Lectures + tutorials)	Quiz Exam Report
9	**4**	Analyzes the combined cycle plant, the energy and mass balance equations are used to analyze the irreversible Brayton and Rankine cycles, with air and water/steam as the working fluids respectively	Combined Cycles	(Lectures + tutorials)	Quiz Exam Report
10	**4**	Identifying the variable plant factors in the cost analysis of various power plants.	Economics Of Power Plants	(Lectures + tutorials)	Quiz Exam Report

11	**4**	Identifying the variable plant factors in the cost analysis of various power plants.	Economics Of Power Plants	(Lectures + tutorials)	Quiz Exam Report
12	**4**	Identifying the variable plant factors in the cost analysis of various power plants.	Cost Analysis Of A Power Plant	(Lectures + tutorials)	Quiz Exam Report
13	**4**	Understanding the essential components and working principles of Diesel and Hydro-Water power plants.	Introduction To Diesel Power Plant	(Lectures + tutorials)	Quiz Exam Report
14	**4**	Understanding the essential components and working principles of Diesel and Hydro-Water power plants.	Diesel Engine Performance And Operation	(Lectures + tutorials)	Quiz Exam Report
15	**4**	Understanding the essential components and working principles of Diesel and Hydro-Water power plants.	Hydro-Water Power Plant	(Lectures + tutorials)	Quiz Exam Report

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, and three-hour final course exam= 60%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Power Plant Technology by M. M. El Wakil • Power plant by F.T. Morse • Power Plant Engineering by R. K. Hegde • Applied Thermodynamics for Engineering Technologist by T. D.Eastop& J Mc. Conkey
Main references (sources)	• Power Plant Technology by M. M. El Wakil
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Engineering metallurgy
2. Course Code:
ME 2304
3. Semester / Year:
2nd / 2024
4. Description Preparation Date:
19/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Kadhum A. Abed** Email: **kadhum1968@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• To provide an understanding of the crystalline structure of metals. • Knowing the Iron/ Carbon phase diagram and the effect of rapid cooling, • To know what is the Thermal Equilibrium Diagrams? To know the Heat Treatment processes, stress relieving, Annealing, full annealing, incomplete annealing, Isothermal annealing, diffusing annealing (homogenizing) annealing of casting, spherioidosing

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' After successful completion of this course, the students will be able to: 1. explain the basic concepts of metallurgy. 2. Understand of the crystalline structure, and relate chemical composition, structure and 3. properties of metallic materials. 4. Adjust the structure and properties of metallic materials according to their 5. applications. 6. Describe and understand Thermal Equilibrium Diagrams, Iron/ Carbon phase diagram 7. and Heat Treatment processes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn the correct steps to microstructure.	**1.Introdution:Engineering metallurgy**	(Lectures + tutorials + Lab)	Quiz Exam Report
2	4	Studying the effect of increasing the percentage of carbon on the mechanical properties and microstructure of steel.	Crystal structure	(Lectures + tutorials + Lab)	Quiz Exam Report
3	4	Studying the effect of heat treatments on the mechanical properties and microstructure of steel.	Density computations and	(Lectures + tutorials + Lab)	Quiz Exam Report
4	4	Learn the correct steps to check the hardness of metals.	Crystallographic points, directions, and planes	(Lectures + tutorials + Lab)	Quiz Exam Report
5	4	Studying the effect of increasing the percentage of carbon on the mechanical properties and microstructure of steel.	Alloying and solidification of metals	(Lectures + tutorials + Lab)	Quiz Exam Report
6	4	Studying the effect of heat treatments on the mechanical properties and microstructure of steel.	The iron–carbon system	(Lectures + tutorials + Lab)	Quiz Exam Report
7	4	Learn the correct steps to check the hardness of metals.	Cast iron	(Lectures + tutorials + Lab)	Quiz Exam Report
8	4	Studying the effect of increasing the percentage of carbon on the mechanical properties and microstructure of steel.	Heat treatment	(Lectures + tutorials + Lab)	Quiz Exam Report
9	4	Studying the effect of heat treatments on the mechanical properties and microstructure of steel.	**Heat treat ment**	(Lectures + tutorials + Lab)	Quiz Exam Report
10	4	Learn the correct steps to check the hardness of metals.	Annealing , quenching	(Lectures + tutorials + Lab)	Quiz Exam Report
11	4	Studying the effect of increasing the percentage of carbon on the mechanical properties and microstructure of steel.	Sphereodizing	(Lectures + tutorials + Lab)	Quiz Exam Report
12	4	Studying the effect of heat treatments on the	High carbon steel	(Lectures + tutorials +	Quiz Exam

		mechanical properties and microstructure of steel.		Lab)	Report
13	**4**	Learn the correct steps to check the hardness of metals.	Heat treatment of Cast iron	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**4**	Studying the effect of increasing the percentage of carbon on the mechanical properties and microstructure of steel.	Cu – Zn alloys	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**	Studying the effect of heat treatments on the mechanical properties and microstructure of steel.	Cast iron	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Lab =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ .1The metallurgy: structure, properties and heat treatment by D. J. D. and L. A. O. ▪ .2Materials and Processes in Manufacturing by E.P Degarmo. ▪ 3. Materials Science and Engineering An Introduction by William D. Callister, Jr..
Main references (sources)	▪ 1. The metallurgy: structure, properties and heat treatment by D. J. D. and L. A. O. ▪
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

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

2024−2025

Introduction:

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

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

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), 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 emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational 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 Anbar**.....

Faculty/Institute: ..... **Engineering College**.....

Scientific Department: ..... **Mechanical Engineering**.....

Academic or Professional Program Name: ... **Bachelor's degree in Mechanical Engineering**.

Final Certificate Name: ... **Bachelor of Science (B.Sc.) in Mechanical Engineering**.....

Academic System: **..... Semesters.....**

Description Preparation Date: **29/9/2024**

File Completion Date: **29/9/2024**

Signature:

Head of Department Name:

Asst. Prof. Dr. Khaldoon F. Brethee

Date:

Signature:

Scientific Associate Name:

Prof. Dr. Mohammed A. Ahmed

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

Prof. Dr. Ameer A. Hilal

1. Program Vision

The department of Mechanical Engineering endeavors to be one of the leading Mechanical Engineering programs in order to improve and serve local and global communities.

2. Program Mission

The department of Mechanical Engineering's mission aims to contribute to high-quality education in the Mechanical discipline and encourage scientific research that helps to solve mechanical problems by employing modern technology and advanced knowledge.

3. Program Objectives

The Mechanical Engineering program provides graduates with solid practical and professional knowledge in this field of engineering through:

1) Provide a high quality of mechanical engineering education via outstanding teaching, innovative curriculum, and career-relevant training programs.
2) Encourage and promote execution innovative research and find solutions for the complex problems related to mechanical engineering.
3) Prepare mechanical engineers adhered to the professional ethics, applicable laws and the accepted standards to prevent corruption and deviation.
4) Promote the quality of education and scientific research for the academic staff and employees of the department.
5) Offer mechanical engineering consulting services that satisfy a community's and an institution's requirements.

4. Program Accreditation

No

5. Other external influences

No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	5	16	11%	
College Requirements	7	37	26%	
Department Requirements	39	85	59%	
Summer Training	0	0		
Other	3	6	4%	

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
2023/2024/ First Year/ Semester I	ENG 003	Calculus I	3	-
	ENG 006	Engineering Mechanics I (Static)	3	-
	MEC 001	Principles of Manufacturing Process	2	2
	UOA 005	Human Rights and Democracy	2	-
	UOA 007	Computer Science	1	2
	ENG 001	Physics	3	2
	UOA 001	Arabic Language	2	-
2023/2024/ First Year/ Semester 2	ENG 004	Calculus II	3	-
	MEC 002	engineering Mechanics- II(Dynamics)	2	-
	ENG 007	Engineering Drawing	2	2

	UOA 002	Chemistry	2	-
	UOA 003	English Language		
	ENG 005	Fundamentals of Electrical Engineering	2	2
	MEC 003	Computer Programming	1	2
2023/2024/ Second Year/ Semester 1	ENG 008	Calculus-III	3	-
	MEC 005	Fluid Mechanics-I	2	2
	MEC 006	Strength of Materials-I	2	2
	MEC 004	Thermodynamics-I	2	2
	MEC 007	Mechanical drawing	2	2
	MEC 012	Electrical Machines	2	2
	UOA 006	The Crimes of Baath Regime in Iraq	2	-
2023/2024/ Second Year/ Semester 2	ENG 012	Ethics and Leadership Skills	2	-
	ENG 009	Calculus-IV	3	-
	MEC 011	Engineering Metallurgy	2	2
	MEC 009	Fluid Mechanics-II	2	2
	MEC 010	Strength of Materials-II	2	2
	MEC 008	Thermodynamics-II	2	2
2023/2024/ Third Year/ Semester 1	ME 3309	Gas Dynamics	2	-
	ME 3201	Engineering Statistics	3	-
	ME 3301	Engineering Analysis	4	-
	ME 3302	Heat Transfer-I	2	2
	ME 3303	Theory of Machines-I	2	2
	ME 3304	Internal Combustion Engines	2	-
	ME 3306	Research Methodology	1	-
2023/2024/ Third Year/ Semester 2	ME 3101	English Language-III	2	-
	ME 3202	Engineering Numerical Methods	2	2
	ME 3305	Manufacturing Processes	2	-
	ME 3102	Management and Leadership Skills	2	-
	ME 3307	Heat Transfer-II	2	2
	ME 3308	Theory of Machines-II	2	2
	ME 3310	Industrial Engineering and Economic Analysis	2	-
2023/2024/ Fourth Year/ Semester1	ME 4301	Design of Machine Elements-I	3	-
	ME 4310	Final Year Project-I	2	1
	ME 4302	Air Conditioning	2	2
	ME 4301 E	Computational Fluid Dynamics (CFD)	2	2
	ME 4304	Mechanical Vibrations	2	-
	ME 4308	Engineering Materials	2	-
	ME 4101	English Language-IV	2	-
2023/2024/ Fourth Year/ Semester 2	ME 4305	Finite Element Method (FEM)	2	2
	ME 4306	Design of Machine Elements-II	3	-
	ME 4307	Refrigeration	2	2
	ME 4309	Control Systems	2	-
	ME 4302 E	Renewable Energy	2	-
	ME 4303	Power Plants	2	-
	ME 4310	Final Year Project-II	2	1

8. Expected learning outcomes of the program

Knowledge	
An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
Skills	
An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. An ability to communicate effectively with a range of audiences.	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
Ethics	
An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

9. Teaching and Learning Strategies

1-Explaining the scientific material to the students in detail.

2- Students' participation in solving mathematical problems

3- Discussion and dialogue about vocabulary related to the topic

10. Evaluation methods

Implemented at all stages of the program in general.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	General Mech.Eng.	Power			4	4
Assistant Professor	General Mech.Eng.	Power			2	2
Lecturer	General Mech.Eng.	Power			2	2
Assistant Lecturer	General Mech.Eng.	Power			1	1
Professor	General Mech.Eng.	Applied			1	1
Assistant Professor	General Mech.Eng.	Applied			4	4
Lecturer	General Mech.Eng.	Applied			0	0
Assistant Lecturer	General Mech.Eng.	Applied			2	2
Professor	General Mech.Eng.	production			0	0
Assistant Professor	General Mech.Eng.	industrial			1	1
Lecturer	General Mech.Eng.	production			3	3
Assistant Lecturer	General Mech.Eng.	production			1	1

Professional Development

Mentoring new faculty members

Professional development of faculty members

12. **Acceptance Criterion**
https://uoanbar.edu.iq/myuoa/student/login

13. **The most important sources of information about the program**
https://www.uoanbar.edu.iq/EngineeringCollege/English/CMS.php?ID=121

14. Program Development Plan
https://www.uoanbar.edu.iq/EngineeringCollege/English/CMS.php?ID=253

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
2023/2024/ First Year	ENG 003	Calculus I	Basic	√				√							
	ENG 006	Engineering Mechanics I (Static)	Basic					√							
	MEC 001	Principles of Manufacturing Process	Basic	√											
	UOA 005	Human Rights and Democracy	Optional	√											
	UOA 007	Computer Science	Optional	√											
	ENG 001	Physics	Basic	√											
	UOA 001	Arabic Language	Optional	√											
	ENG 004	Calculus II	Basic	√				√							
	MEC 002	engineering Mechanics-II(Dynamics)	Basic					√							

	ENG 007	Engineering Drawing	**Basic**	√				√							
	UOA 002	Chemistry	**Optional**	√											
	UOA 003	English Language	**Basic**	√											
	ENG 005	Fundamentals of Electrical Engineering	**Basic**	√											
	MEC 003	Computer Programming	**Basic**	√				√							
2023/2024/ Second Year	ENG 008	Calculus-III	**Basic**		√										
	MEC 005	Fluid Mechanics-I	**Basic**			√				√					
	MEC 006	Strength of Materials-I	**Basic**			√				√					
	MEC 004	Thermodynamics-I	**Basic**			√									
	MEC 007	Mechanical drawing	**Basic**	√											
	MEC 012	Electrical Machines	**Basic**			√				√					
	UOA 006	The Crimes of Baath Regime in Iraq	**Optional**	√											
	ENG 012	Ethics and Leadership Skills	**Basic**							√					
	ENG 009	Calculus-IV	**Basic**							√					

	MEC 011	Engineering Metallurgy	**Basic**		√										
	MEC 009	Fluid Mechanics-II	**Basic**							√					
	MEC 010	Strength of Materials-II	**Basic**			√				√					
	MEC 008	Thermodynamics-II	**Basic**			√				√					
2023/2024/ Third Year	ME 3309	Gas Dynamics	**Basic**	√											
	ME 3201	Engineering Statistics	**Basic**		√				√						
	ME 3301	Engineering Analysis	**Basic**		√				√						
	ME 3302	Heat Transfer-I	**Basic**			√				√					
	ME 3303	Theory of Machines-I	**Basic**			√				√					
	ME 3304	Internal Combustion Engines	**Basic**			√								√	
	ME 3306	Research Methodology	**Basic**	√								√			
	ME 3101	English Language-III	**Basic**			√								√	
	ME 3202	Engineering Numerical Methods	**Basic**							√				√	

	ME 3305	Manufacturing Processes	**Basic**							√				√	
	ME 3102	Management and Leadership Skills	**Basic**			√				√					
	ME 3307	Heat Transfer-II	**Basic**			√				√					
	ME 3308	Theory of Machines-II	**Basic**							√				√	
	ME 3310	Industrial Engineering and Economic Analysis	**Basic**							√					√
2023/2024/ Fourth Year	ME 4301	Design of Machine Elements-I	**Basic**			√				√					√
	ME 4310	Final Year Project-I	**Basic**			√								√	
	ME 4302	Air Conditioning	**Basic**								√				√
	ME 4301 E	Computational Fluid Dynamics (CFD)	**Basic**			√					√				
	ME 4304	Mechanical Vibrations	**Basic**				√								√
	ME 4308	Engineering Materials	**Basic**			√				√					
	ME 4101	English Language-IV	**Basic**				√				√				√
	ME 4305	Finite Element Method (FEM)	**Basic**	√				√							

	ME 4306	Design of Machine Elements-II	**Basic**			√				√					
	ME 4307	Refrigeration	**Basic**				√								√
	ME 4309	Control Systems	**Basic**			√				√					
	ME 4302 E	Renewable Energy	**Basic**			√					√				
	ME 4304 E	Computational Fluid Dynamics (CFD)	**Basic**								√				√
	ME 4310	Final Year Project-II	**Basic**			√				√					

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

Course Description Form

1. Course Name:
Control Systems
2. Course Code:
ME4309
3. Semester / Year:
2nd / 2025
4. Description Preparation Date:
19/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Khaldoon F. Brethee** Email: **Khaldon77m@uoanbar.edu.iq** Name: **Mr. Ahmed Yasin Ali** Email: **ahmed.yasin@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• Demonstrate an understanding of the fundamentals of (feedback) control systems. • Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems. • Express and solve system equations in state-variable form (state variable models). • Determine the time and frequency-domain responses of first and second-order systems to step and sinusoidal (and to some extent, ramp) inputs. • Determine the (absolute) stability of a closed-loop control system. • Apply root-locus technique to analyze and design control systems.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. Also, encourage students to learn various methods for analyzing the time response, frequency response and stability of the systems. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Identify open and closed loop control system and formulate mathematical model of physical systems.	Introduction to automatic control	(Lectures + tutorials + Lab)	Quiz Exam Report
2	4	Identify open and closed loop control system and formulate mathematical model of physical systems.	Representation of control components	(Lectures + tutorials + Lab)	Quiz Exam Report
3	4	Compute the characteristics of trainset responses and stability of various control systems and use these states to design a desired control system	Representation of control systems	(Lectures + tutorials + Lab)	Quiz Exam Report
4	4	Compute the characteristics of trainset responses and stability of various control systems and use these states to design a desired control system	Mass, spring damper system	(Lectures + tutorials + Lab)	Quiz Exam Report
5	4	Compute the characteristics of trainset responses and stability of various control systems and use these states to design a desired control system	Hydraulic system	(Lectures + tutorials + Lab)	Quiz Exam Report
6	4	Compute the characteristics of trainset responses and stability of various control systems and use these states to design a desired control system	Pneumatic system	(Lectures + tutorials + Lab)	Quiz Exam Report
7	4	To solve various practical applications	Steady-state operation	(Lectures + tutorials + Lab)	Quiz Exam Report
8	4	Use Evans root locus and Frequency response methods in control design for real world systems	Laplace transformer	(Lectures + tutorials + Lab)	Quiz Exam Report
9	4	Use Evans root locus and Frequency response methods in control design for real world systems	The characteristic function	(Lectures + tutorials + Lab)	Quiz Exam Report
10	4	Learn the measurement systems, errors of measurement, as well as explain working principles of sensors and transducers.	Transient and steady-state responses	(Lectures + tutorials + Lab)	Quiz Exam Report
11	4	Learn the measurement systems, errors of measurement, as well as explain working principles of sensors and transducers.	Steady-state operation	(Lectures + tutorials + Lab)	Quiz Exam Report
12	4	To solve various practical applications	Laplace transformer	(Lectures + tutorials + Lab)	Quiz Exam Report
13	4	To solve various practical applications	Transient and steady-state responses	(Lectures + tutorials + Lab)	Quiz Exam Report

14	**4**	Learn the measurement systems, errors of measurement, as well as explain working principles of sensors and transducers.	Steady-state errors in control systems	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**	Use Evans root locus and Frequency response methods in control design for real world systems	Stability of control systems	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Lab =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ 1. Automatic Control Engineering, First Edition 1961, by Francis H. Raven, McGraw Hill. ▪ 2. Measurement Systems Applications and Design, 5th edition 2003, by E. Doebelin, McGraw Hill.
Main references (sources)	▪ Ogata, K. (2010). Modern control engineering (Vol. 5). Upper Saddle River, NJ: Prentice hall.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Mechanical Vibrations
2. Course Code:
ME 4304
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
19/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Khaldoon F. Brethee** Email: **Khaldon77m@uoanbar.edu.iq** Name: **Mr. Ahmed Yasin Ali** Email: **ahmed.yasin@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	1. Formulate mathematical models of problems in vibrations using Newton's second law or energy principles. 2. familiarize the student with the underlying concepts of linear mechanical vibrations through analysis of the free and forced responses of various single degree-of-freedom (SDOF) and multiple degree-of-freedom (MDOF) systems. 3. Determine a complete solution to the modelled mechanical vibration problems. 4. Correlate results from the mathematical model to physical characteristics of the actual system

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. Also, encourage students to learn various methods for deriving mathematical representation of the applications of vibration systems. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Derive the equations of motion for single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Fundamentals of Vibration	(Lectures + tutorials + Lab)	Quiz Exam Report
2	4	Derive the equations of motion for single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Modeling Vibration / Harmonic motion	(Lectures + tutorials + Lab)	Quiz Exam Report
3	4	Derive the equations of motion for single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Free vibration of undamped SDOF systems (Newton's laws, Energy Method)	(Lectures + tutorials + Lab)	Quiz Exam Report
4	4	Derive the equations of motion for single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Longitudinal and torsional vibrations of bars or Shafts	(Lectures + tutorials + Lab)	Quiz Exam Report
5	4	Understand the goal of damping systems in mechanical vibrating systems.	Free vibration of viscously damped SDOF systems	(Lectures + tutorials + Lab)	Quiz Exam Report
6	4	Understand the goal of damping systems in mechanical vibrating systems.	Free vibration of damped SDOF systems with Coulomb and hysteretic damping	(Lectures + tutorials + Lab)	Quiz Exam Report
7	4	Model, calculate and interpret the response of vibrating of single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Harmonically forced SDOF systems (rotating imbalance, vibration isolation)	(Lectures + tutorials + Lab)	Quiz Exam Report
8	4	Model, calculate and interpret the response of vibrating of single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Harmonically forced SDOF systems (support motion,whirling of shafts)	(Lectures + tutorials + Lab)	Quiz Exam Report
9	4	Model, calculate and interpret the response of vibrating of single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Free vibration of 2 DOF systems	(Lectures + tutorials + Lab)	Quiz Exam Report
10	4	Model, calculate and interpret the response of vibrating of single degree of freedom (SDOF) and multi-degree of freedom systems (MDOF).	Free vibration of 2 DOF systems	(Lectures + tutorials + Lab)	Quiz Exam Report
11	4	Analyse the vibratory behaviour of different mechanical vibration systems subjected to harmonic force or impulsive force.	Eigenvalue problem for free vibration of 2 DOF	(Lectures + tutorials + Lab)	Quiz Exam Report
12	4	Analyse the vibratory behaviour of different mechanical vibration systems subjected to harmonic force or impulsive force.	Forced vibration of 2 DOF systems	(Lectures + tutorials + Lab)	Quiz Exam Report
13	4	Design model systems that minimize the transmission of vibration to mechanical or structural systems.	Equations of motion for MDOF systems	(Lectures + tutorials + Lab)	Quiz Exam Report

14	**4**	Design model systems that minimize the transmission of vibration to mechanical or structural systems.	Forced vibrations of MDOF systems using modal analysis	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**		Progress Exam	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Lab =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Rao, S. S., & Yap, F. F. (1995). Mechanical vibrations (Vol. 4, pp. 75-848). New York: Addison-wesley
Main references (sources)	Thomson, W. T. (2018). Theory of vibration with applications. CrC Press.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
English Language
2. Course Code:
UOA 003
3. Semester / Year:
2nd / 2025
4. Description Preparation Date:
26/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Theoretical / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Khaldoon F. Brethee** Email: **Khaldon77m@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	1. Expand vocabulary and enhance communication in everyday situations. 2. Improve grammar skills for more accurate speaking and writing. 3. Develop better listening comprehension abilities. 4. Enhance spoken English fluency, accuracy, and pronunciation. 5. Improve reading comprehension and extract key information from texts. 6. Strengthen writing skills for well-structured and grammatically accurate compositions. 7. Increase cultural awareness of English-speaking societies and customs.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, speaking interactive activities and by considering type of activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Develop academic writing	• Tenses • Using a bilingual dictionary	(Lectures + tutorials)	Quiz Exam Report
2	4	Apply reading skills	Present tenses Collection: daily life	(Lectures + tutorials)	Quiz Exam Report
3	4	Expand academic vocabulary through reading	Past tenses Time expressions	(Lectures + tutorials)	Quiz Exam Report
4	4	Speak through group discussions and debates	Much/ many- a few, a little, a lot of	(Lectures + tutorials)	Quiz Exam Report
5	4	Develop academic writing	Shopping Verb patterns-1 Hot verbs	(Lectures + tutorials)	Quiz Exam Report
6	4	Apply reading skills	What ……. Like? Synonyms and antonyms	(Lectures + tutorials)	Quiz Exam Report
7	4	Expand academic vocabulary through reading	●Present perfect For, since Adverbs word	(Lectures + tutorials)	Quiz Exam Report
8	4	Speak through group discussions and debates	Time clauses In the hotel	(Lectures + tutorials)	Quiz Exam Report
9	4		**Mid Term Exam**	(Lectures + tutorials)	Quiz Exam Report
10	4	Apply reading skills Develop academic writing	Verb patterns-2 adjectives Passives Notices	(Lectures + tutorials)	Quiz Exam Report
11	4	Expand academic vocabulary through reading	Second conditional Phrasal verbs	(Lectures + tutorials)	Quiz Exam Report
12	4	Speak through group discussions and debates	●Present perfect continuous ●word formation	(Lectures + tutorials)	Quiz Exam Report
13	4	Develop academic writing	word formation writing letters	(Lectures + tutorials)	Quiz Exam Report
14	4	Apply reading skills	Phrasal verbs Exclamations	(Lectures + tutorials)	Quiz Exam Report
15	4	Expand academic vocabulary through reading	writing a story	(Lectures + tutorials)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Midterm exam =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ John & Liz Soars, "New Headway Plus- Pre-Intermediate Student's Book", 10th ed 2012.
Main references (sources)	• -Raymond Murphy; "English Grammar in Use", 4th edition 2012 • Understanding and Using English Grammar, Vol. A, 4th Edition 4th Edition
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Engineering Materials
2. Course Code:
ME 4308
3. Semester / Year:
1st / 2024-2025
4. Description Preparation Date:
19/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 **theoretical (45 Hours) / 2 Units**
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Zinah Jumaah Ahmed Email: zinah.j.ahmed@uoanbar.edu.iq
8. Course Objectives

Course Objectives	• Understand the practical concepts of engineering materials and their properties and applications. • Apply the knowledge of material properties and material selection foundations that are related to mechanical Engineering program.
9. Teaching and Learning Strategies	
Strategy	ME 4308 Engineering Materials is compulsory course which is offered to 4th year for Mechanical Engineering Department students and equips students to study the properties of engineering materials well as the limits of their use and the classification of these materials according to their structure. Also, the selecting methods of engineering materials for each application are investigated. The course material is presented in a series of online or face-to-face lectures and/or videos of the manufacturing processes. Students are expected to conduct a significant amount of self-directed learning for this module. The core teaching material is supplemented by weekly tutorial sessions. With a strong emphasis on understanding all

	engineering material properties and the main features that could be used for select a suitable material in different industry fields and their application and other factors related to them. As well as applying their knowledge to current research projects within the School of Engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Identify the types of material properties in general	Material Properties	(Lectures)	Quiz Exam
2	3	Identify the types of mechanical properties in terms of static and dynamic state such as tensile test, compression test, hardness test, impact test and fatigue test.	Mechanical Properties	(Lectures)	Quiz Exam Report
3	3	Identify the types of properties that effect by the temperature such as creep test	Temperature Effect	(Lectures)	Quiz Exam
4	3	Identify the types of physical properties such as density, specific heat thermal conductivity and magnetic properties	Physical Properties	(Lectures)	Quiz Exam
5	3	Identify the types of physical properties such as density, specific heat thermal conductivity and magnetic properties	Physical Properties	(Lectures)	Quiz Exam
6	3	learn all the types of ferrous metal such as steel, plain carbon steel, alloy steels, iron and its properties	Engineering Materials (Ferrous Metal)	(Lectures)	Quiz Exam
7	3	learn all the types of ferrous metal such as steel, plain carbon steel, alloy steels, iron and its properties	Engineering Materials (Ferrous Metal)	(Lectures)	Quiz Exam
8	3	learn all the types of non-ferrous metal such as copper, aluminum, magnesium and its properties	Engineering Materials (Nonferrous Metal)	(Lectures)	Quiz Exam
9	3	learn all the types of non-ferrous metal such as copper, aluminum, magnesium and its properties	Engineering Materials (Nonferrous Metal)	(Lectures)	Quiz Exam
10	3	learn all the types of non-metallic materials such as composite materials and its properties	Engineering Materials (Non-metallic)	(Lectures)	Quiz Exam

11	**3**	learn all the types of non-metallic materials such as composite materials and its properties	Engineering Materials (Non-metallic)	(Lectures)	Quiz Exam
12	**3**	learn how designation the Ferrous Metal	Designation the Engineering Materials	(Lectures)	Quiz Exam
13	**3**	learn how designation the Ferrous Metal	Designation the Engineering Materials	(Lectures)	Quiz Exam
14	**3**	study the main feature of select the material	Selection of Materials	(Lectures)	Quiz Exam Report
15	**3**	study the main feature of select the material	Selection of Materials/ Application	(Lectures)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Materials and processes in manufacturing, 10th Edition, 2008. J T. Black, R. A. Kohser and E. P. Degarmo, • Materials Science and Engineering an Introduction William D. Callister, Jr. • 3- Foundations of Materials Science and Engineering, by William F. smith & Javad Hashemi
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Principles of manufacturing process

2. Course Code:

MEC 001

3. Semester / Year:

1st / 2024

4. Description Preparation Date:

19/9/2024

5. Available Attendance Forms:

In-person lectures

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

30 theoretical +30 Tutorial +30 practical (90 Hours) / 3 Units

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

Name: **Dr. Kadhum A. Abed**
Email kadhum1968@uoanbar.edu.iq

8. Course Objectives

Course Objectives	The goals of this course are to enable students to: 1. Students should understand of the principles of the major manufacturing processes. 2. Students should be able to recognize the standard processes used to produce products 3. Students should be able to select the optimal process to produce a product.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to: 1. To understand the principle of manufacturing engineering. 2. To obtain important information about the iron ores and how can obtain the different types of iron and steel. 3. To classify materials and their improvement properties. 4. To know the different types of machining processes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**5**	Engineering materials	Introduction to engineering material	(Lectures + tutorials + Lab)	Quiz Exam Report
2	**5**	Introduction to entrepreneurship,	Representation of entreoreneurship	(Lectures + tutorials + Lab)	Quiz Exam Report
3	**5**	Manufacturing processes: casting, welding, forming, working ,joining processes.	Representation of MFG	(Lectures + tutorials + Lab)	Quiz Exam Report

4	**5**	Hand work and hand tools,	Handwork	(Lectures + tutorials + Lab)	Quiz Exam Report
5	**5**	Concept of machining processes, turning, drilling milling, and grinding.	maching	(Lectures + tutorials + Lab)	Quiz Exam Report
6	**5**	Metrological concepts.	Metrological tools	(Lectures + tutorials + Lab)	Quiz Exam Report
7	**5**	Industrial safety.	Safety	(Lectures + tutorials + Lab)	Quiz Exam Report
8	**5**	Engineering materials	Material for manufacturing	(Lectures + tutorials + Lab)	Quiz Exam Report
9	**5**	Introduction to entrepreneurship,	The characteristic function	(Lectures + tutorials + Lab)	Quiz Exam Report
10	**5**	Manufacturing processes: casting, welding, forming, working ,joining processes.	MFG processes	(Lectures + tutorials + Lab)	Quiz Exam Report
11	**5**	Hand work and hand tools,	Workshop	(Lectures + tutorials + Lab)	Quiz Exam Report
12	**5**	Concept of machining processes, turning, drilling milling, and grinding.	Machining	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**5**	Turning process	Turning process	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**5**	Milling process	Milling process	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**5**	Engineering materials	Material for cutting	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Lab =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. principles of manufacturing, Groover 2. Modern Workshop
Main references (sources)	1. Manufacturing Process, Williams
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Renewable Energy

2. Course Code:

ME 4302E

3. Semester / Year:

2 / 2024

4. Description Preparation Date:

22/9/2024

5. Available Attendance Forms:

In-person lectures

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

30Theoretical +15 Tutorial + (45Hours) / 2 Credit Hours

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

Name: **Dr. Ahmed Ali Najeeb**
Email: **ashaab_1977@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	1. To Understand the various forms of conventional energy resources 2. To have a knowledge on Renewable and Sustainable Energy. 3. To Learn the present energy scenario and the need for energy conservation 4. To compare the renewable energy sources with the conventional sources. 5. To be catalyst for awareness about the Renewable Energy and Energy Conservation in the Society. 6. To outline division aspects and utilization of renewable energy sources for both domestics and industrial application. 7. To analyze the environmental aspects of renewable energy resources.

9. Teaching and Learning Strategies

Strategy	This is an elective course for Mechanical Engineering Program. The course will cover the basic principles of Renewable Energy.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.	Introduction to Renewable Energy	(Lectures + tutorials)	Quiz Exam HW

2	**4**	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.	Introduction to Solar Energy	(Lectures + tutorials)	Quiz Exam HW
3	**4**	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.	Introduction to Solar Energy	(Lectures + tutorials)	Quiz Exam HW
4	**4**	Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations.	Introduction to Solar Energy	(Lectures + tutorials)	Quiz Exam HW
5	**4**	Provide a solid foundation for developing the use of renewable energy systems	Designing of Thermal Solar Collectors	(Lectures + tutorials)	Quiz Exam HW
6	**4**	Provide a solid foundation for developing the use of renewable energy systems	Designing of Thermal Solar Collectors	(Lectures + tutorials)	Quiz Exam HW
7	**4**	Provide a solid foundation for developing the use of renewable energy systems	Designing of Thermal Solar Collectors	(Lectures + tutorials)	Quiz Exam HW
8	**4**	Perform an initial design of a renewable energy system.	Designing of PV System	(Lectures + tutorials)	Quiz Exam HW
9	**4**	Perform an initial design of a renewable energy system.	Designing of PV System	(Lectures + tutorials)	Quiz Exam HW
10	**4**	Know the need of renewable energy resources, historical and latest developments.	Energy Conservation	(Lectures + tutorials)	Quiz Exam HW
11	**4**	Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations.	Energy Conservation	(Lectures + tutorials)	Quiz Exam HW
12	**4**	Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations.	(Hydroelectric ,geothermal ,Biomass,Tidal)	(Lectures + tutorials)	Quiz Exam HW
13	**4**	Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.	(Hydroelectric ,geotherm al ,Biomass,Tidal)	(Lectures + tutorials)	Quiz Exam HW
14	**4**	Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.	Energy Conservation	(Lectures + tutorials)	Quiz Exam HW

15	**4**	Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.	Energy Conservation	(Lectures + tutorials)	Quiz Exam HW

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20% and three-hour final course exam= 60%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if an	▪ JOHN N DUFFIE" Solar Energy Thermal Process" John Wiley&Sons, 2013 ▪ SOTERIS A. KALOGIROU " Solar Energy Engineering Processes and Systems" Academic Press is an imprint of Elsevier, 2014 ▪ PETER J. LUNDE" Solar Thermal Engineering" John Wiley&Sons, 1980
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Engineering Mechanics-I (Statics)
2. Course Code:
ENG 006
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
22/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 Theoretical +15 Tutorial (60 Hours) / 3 Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. AHMED N. UWAYED** Email: **ahmed.noori@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• Develop engineering problem solving techniques including: rigid body equilibrium in 2D and 3D force systems, appropriate support reactions, moments of forces, equivalent systems, center of gravity, trusses, frames, friction concepts, moment of inertia, parallel axis theorem, and mass moment of inertia. • Students learn to use vector methods and free body diagram development as tools to logically approach and solve problems in both the SI and U.S. customary systems. • understand how to analyze practical engineering structures under force and moment systems. • Have a strong foundation of the engineering mechanics principles and methods required for use as qualified engineers.

9. Teaching and Learning Strategies	
Strategy	Lecture-based instruction, technology-based learning, individual and group learning, inquiry-based learning, and expeditionary learning are some examples of teaching methodologies.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Determine the resultant of coplanar forces and non-concurrent force systems for particles and rigid bodies in two or three dimensions.	Force system: resultant of forces on particles in two and three dimensions.	(Lectures + tutorials + Homework)	Quiz Exam Report
2	**4**	Use Free Body Diagrams to solve static problems to understand all types of forces that act on bodies.	Equilibrium of particles: free-body-diagram, equation of equilibrium.	(Lectures + tutorials + Homework)	Quiz Exam Report
3	**4**	Explain the principles of static equilibrium.	Force system resultants: resultant of force and moment on rigid body, couples, moment about point in two and three dimensions, moment about axis.	(Lectures + tutorials + Homework)	Quiz Exam Report
4	**4**	Solve problems relating to the forces in truss members.	Equilibrium of a rigid body: free-body diagrams, equations of equilibrium.	(Lectures + tutorials + Homework)	Quiz Exam Report
5	**4**	Analyze the forces acting on the members of frames and machines.	Equilibrium of a rigid body: free-body diagrams, equations of equilibrium.	(Lectures + tutorials + Homework)	Quiz Exam Report
6	**4**	Determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shapes.	Trusses: method of joint and sections	(Lectures + tutorials + Homework)	Quiz Exam Report
7	**4**	Develop a method for determining the moment of inertia for an area.	Trusses: method of joint and sections	(Lectures + tutorials + Homework)	Quiz Exam Report
8	**4**	Solve problems relating to dry friction, including inclined planes.	Frames: free-body diagrams, equations of equilibrium.	(Lectures + tutorials + Homework)	Quiz Exam Report
9	**4**	Determine the support reactions on a structures.	Frames: free-body diagrams, equations of equilibrium.	(Lectures + tutorials + Homework)	Quiz Exam Report
10	**4**	Apply virtual work to solve equilibrium problems.	Centroid: centroids of lines, areas, and volumes	(Lectures + tutorials + Homework)	Quiz Exam Report

11	**4**	Explain the principles of static equilibrium.	Centroid: centroids of lines, areas, and volumes	(Lectures + tutorials + Homework)	Quiz Exam Report
12	**4**	Solve problems relating to the forces in truss members.	Moment of inertia: parallel-axis theorem for an area, radius of gyration of an area, moments of inertia for composite areas	(Lectures + tutorials + Homework)	Quiz Exam Report
13	**4**	Analyze the forces acting on the members of frames and machines.	Moment of inertia: parallel-axis theorem for an area, radius of gyration of an area, moments of inertia for composite areas	(Lectures + tutorials + Homework)	Quiz Exam Report
14	**4**	Determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary shapes.	Friction: mechanism of dry friction, static friction.	(Lectures + tutorials + Homework)	Quiz Exam Report
15	**4**	Develop a method for determining the moment of inertia for an area.	Friction: mechanism of dry friction, static friction.	(Lectures + tutorials + Homework)	Quiz Exam Report

1. Course Evaluation	
Quizzes = 25 %, Homework + Report = 10%, Classwork = 5%, Midterm exam = 10%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	▪ Higden , A, stiles W.B. & davis , A.W. Engineering mechanics statics and dynamics 1968.
Main references (sources)	▪ R. C. Hibbeler, "Engineering Mechanics - Statics " 13th Edition, 2012 ▪ J.L Meriam and L.G. Kraige (2016) Engineering mechanics statics
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Theory of Machines-I
2. Course Code:
ME 3303
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
22/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30Theoretical +15 Tutorial + 30 practical (75Hours) / 3 Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. AHMED NOORI UWAYED** Email: **ahmed.noori@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	• Understand the kinematics and dynamics fundamentals of machines Improve skills in computational fluid dynamics to address engineering problems. • Understand techniques for studying motion of machines and their components. • Teach students both graphical and analytical solution methods and the design of planar mechanisms. • Learn the analysis of displacement, velocity, and acceleration diagrams in mechanisms.

9. Teaching and Learning Strategies	
Strategy	Lecture-based instruction, technology-based learning, individual and group learnin inquiry-based learning, and expeditionary learning are some examples of teaching methodologies implemented to achieve learning strategies in this course.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	To gain basic knowledge of kinematics and kinetics for planar mechanisms.	Velocity diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
2	4	To gain basic knowledge of kinematics and kinetics for planar mechanisms.	Velocity diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
3	4	To gain basic knowledge of kinematics and kinetics for planar mechanisms.	Velocity diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
4	4	Formulate and solve for distance, velocity and acceleration analysis of planar linkages.	Acceleration diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
5	4	Formulate and solve for distance, velocity and acceleration analysis of planar linkages.	Acceleration diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
6	4	Formulate and solve for distance, velocity and acceleration analysis of planar linkages.	Acceleration diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
7	4	Successfully practice the concepts of power transmission and steering gear mechanisms.	Hook's Joint	(Lectures + tutorials + Lab)	Quiz Exam Report
8	4	Successfully practice the concepts of power transmission and steering gear mechanisms.	Hook's Joint	(Lectures + tutorials + Lab)	Quiz Exam Report
9	4	Successfully practice the concepts of power transmission and steering gear mechanisms.	Steering mechanisms	(Lectures + tutorials + Lab)	Quiz Exam Report
10	4	Successfully practice the concepts of power transmission and steering gear mechanisms.	Steering mechanisms	(Lectures + tutorials + Lab)	Quiz Exam Report
11	4	Understand the importance of gyroscopic couple, flywheel, and governors in real time practice	Gyroscopic couple	(Lectures + tutorials + Lab)	Quiz Exam Report
12	4	Understand the importance of gyroscopic couple, flywheel, and governors in real time practice	Gyroscopic couple	(Lectures + tutorials + Lab)	Quiz Exam Report

13	**4**	Understand the importance of gyroscopic couple, flywheel, and governors in real time practice	Flywheel diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**4**	Understand the importance of gyroscopic couple, flywheel, and governors in real time practice	Flywheel diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**	Understand the importance of gyroscopic couple, flywheel, and governors in real time practice	Flywheel diagrams	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, Lab =10%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	▪ Mechanics of Machines: Elementary theory and examples. By: J. Hannah and R.C. Stephens. ▪ Mechanics of Machines: Advanced theory and examples. By: J. Hannah and R.C. Stephens.
Main references (sources)	▪ Theory of Machine. By: R.S. Khurmi and J. K. Gupta. ▪ Kinematics and Dynamics of Machines. By: G.H. Martin.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Theory of Machines-II
2. Course Code:
ME 3308
3. Semester / Year:
2nd / 2025
4. Description Preparation Date:
22/01/2025
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30Theoretical +15 Tutorial + 30 practical (75Hours) / 3 Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. AHMED NOORI UWAYED** Email: **ahmed.noori@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	• To identify the kinematics and kinetics of different link-based mechanisms. • Understand the various power transmission mechanisms using different methods. • To teach students both graphical and analytical methods of motion analysis and design of planar mechanisms. • Understand the techniques for studying angular and linear motion of rotating machines. • To address the underlying concepts, methods and applications of different machines

9. Teaching and Learning Strategies

Strategy	Lecture-based instruction, technology-based learning, individual and group learning, inquiry-based learning, and expeditionary learning are some examples of teaching methodologies implemented to achieve learning strategies in this course.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Understand the fundamentals of gear theory which will be the prerequisite for gear design.	Balancing of rotating masses	(Lectures + tutorials + Lab)	Quiz Exam Report

2	**4**	Understand the fundamentals of gear theory which will be the prerequisite for gear design.	Balancing of rotating masses	(Lectures + tutorials + Lab)	Quiz Exam Report
3	**4**	Understand the fundamentals of gear theory which will be the prerequisite for gear design.	Balancing of rotating masses	(Lectures + tutorials + Lab)	Quiz Exam Report
4	**4**	Student will be able to perform force analysis of different gears	Spur gearing	(Lectures + tutorials + Lab)	Quiz Exam Report
5	**4**	Student will be able to perform force analysis of different gears	Spur gearing	(Lectures + tutorials + Lab)	Quiz Exam Report
6	**4**	Student will be able to perform force analysis of different gears	Spur gearing	(Lectures + tutorials + Lab)	Quiz Exam Report
7	**4**	Perform the analysis of speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.	Gear trains	(Lectures + tutorials + Lab)	Quiz Exam Report
8	**4**	Perform the analysis of speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.	Gear trains	(Lectures + tutorials + Lab)	Quiz Exam Report
9	**4**	Perform the analysis of speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.	Gear trains	(Lectures + tutorials + Lab)	Quiz Exam Report
10	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.	Belt drive	(Lectures + tutorials + Lab)	Quiz Exam Report
11	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.	Belt drive	(Lectures + tutorials + Lab)	Quiz Exam Report
12	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.	Belt drive	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and	Belt drive	(Lectures + tutorials + Lab)	Quiz Exam Report

		understand cam Jump phenomenon, advance cam curves.			
14	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.	Cams	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**	Student will be able to analyze the problems related to belt drives and identify the design of cam profile for given follower motions and understand cam Jump phenomenon, advance cam curves.	Cams	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, Lab =10%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	▪ Mechanics of Machines: Elementary theory and examples. By: J. Hannah and R.C. Stephens. ▪ Mechanics of Machines: Advanced theory and examples. By: J. Hannah and R.C. Stephens. ▪ Kinematics and Dynamics of Machines. By: G.H. Martin.
Main references (sources)	**None**
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Control Systems

2. Course Code:

ME4303E

3. Semester / Year:

2nd / 2024

4. Description Preparation Date:

19/9/2024

5. Available Attendance Forms:

In-person lectures

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

45 theoretical +15 solutions Issues (60 Hours) / 2 Units

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

Name: **Dr. Hamad M. Hasan**
Email: hamad.m.hasan@uoanbar.edu.iq

Name: **Mr. Ahmed Yasin Ali**
Email: ahmed.yasin@uoanbar.edu.iq

8. Course Objectives

Course Objectives	1. The students should understand the mathematical and physical principles underlying the FEA. 2. To provide students with basic skills of FEA programming using MATLAB. 3. The formulation of finite element methods for linear static analysis of solids and structures.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is the basic fundamentals of the finite element methods. Beginning with simple one-dimensional problem, continuing to two- and three-dimensional elements, and ending with some applications in heat transfer, solid mechanics and fluid mechanics. Covers modelling, mathematical formulation, and computer implementation

10. Course Structure

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

1	**4**	Introduction .	Introduction to FEM	(Lectures + tutorials)	Quiz Exam Report
2	**4**	Bar Element .	Bar Element .	(Lectures + tutorials)	Quiz Exam Report
3	**4**	Beam Element	Beam Element	(Lectures + tutorials)	Quiz Exam Report
4	**4**	Linear static analysis	Linear static analysis	(Lectures + tutorials)	Quiz Exam Report
5	**4**	Two-Dimensional Analysis	Two-Dimensional Analysis	(Lectures + tutorials)	Quiz Exam Report
6	**4**	Finite element for two-dimensional problems	Finite element for two-dimensional problems	(Lectures + tutorials)	Quiz Exam Report
7	**4**	Development of Truss Equations	Development of Truss Equations	(Lectures + tutorials)	Quiz Exam Report
8	**4**	Development of Frame and Grid Equations	Development of Frame and Grid Equations	(Lectures + tutorials)	Quiz Exam Report
9	**4**	Development of the Plane Stress and Plane Strain Stiffness Equations	Development of the Plane Stress and Plane Strain Stiffness Equations	(Lectures + tutorials)	Quiz Exam Report
10	**4**	Isoperimetric Formulation	Isoperimetric Formulation	(Lectures + tutorials)	Quiz Exam Report
11	**4**	Numerical Quadrature, Three-Dimensional Stress Analysis	Numerical Quadrature, Three-Dimensional Stress Analysis	(Lectures + tutorials)	Quiz Exam Report
12	**4**	Finite Element Modelling and Solution Techniques	Finite Element Modelling and Solution Techniques	(Lectures + tutorials)	Quiz Exam Report
13	**4**	Plate Elements	Plate Elements	(Lectures + tutorials)	Quiz Exam Report
14	**4**	Solid Elements for 3-D Elements	Solid Elements for 3-D Elements	(Lectures + tutorials)	Quiz Exam Report
15	**4**	Thermal Analysis	Thermal Analysis	(Lectures + tutorials)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Olek C Zienkiewicz, Robert L Taylor, J.Z. Zhu, *The Finite Element Method: Its Basis and Fundamentals*, Sixth Edition, Butterworth-Heinemann 2005
Main references (sources)	**Olek C Zienkiewicz, Robert L Taylor, J.Z. Zhu, *The Finite Element Method: Its Basis and Fundamentals*, Sixth Edition, Butterworth-Heinemann 2005**
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Research Methodology

2. Course Code:

ME 3306

3. Semester / Year:

1st / 2024-2025

4. Description Preparation Date:

20/9/2024

5. Available Attendance Forms:

In-person lectures

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

Credit Hours (15 Theoretical (15 Hours) / Number of Units (1)

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

Asst. Prof. Dr. Haitham Kamil Dawood
Email: hathim_iraq@uoanbar.edu.iq

8. Course Objectives

Course Objectives	✓ To enable the students to know the qualitative of the project. ✓ To know the information needs for project and research management. ✓ To introduce the concept of scientific research, methodology, methods, and processes. ✓ To connect multidisciplinary sciences in one project, and ✓ To introduce the statistical tools of data analysis.

9. Teaching and Learning Strategies

Strategy	This course covers principles of project proposal, basic of project methodology, overview of the previous works, nature of projects, dealing with results, academic writing, and PPT slide preparation and viva presentation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**1**	To know the qualitative of the project.	Project proposal.	Lectures	Quizzes, Assignments, Exams
2	**1**	To know the qualitative of the project.	Project proposal.	Lectures	Quizzes, Assignments, Exams
3	**1**	To know the necessary information needed for project and research managements.	Basic of research methodology.	Lectures	Quizzes, Assignments, Exams
4	**1**	To know the necessary information needed for project and research	Basic of research methodology.	Lectures	Quizzes, Assignments,

		managements.			Exams
5	**1**	To know the necessary information needed for project and research managements.	Basic of research methodology.	Lectures	Quizzes, Assignments, Exams
6	**1**	To understand the concept of scientific research, methodology, methods, and process.	Review of previous works.	Lectures	Quizzes, Assignments, Exams
7	**1**	To understand the concept of scientific research, methodology, methods, and process.	Review of previous works.	Lectures	Quizzes, Assignments,
8	**1**	To know how to merge different sciences field in one project.	Nature of the projects	Lectures	Quizzes, Assignments, Exams
9	**1**	To know how to merge different sciences field in one project.	Nature of the projects	Lectures	Quizzes, Assignments, Exams
10	**1**	To use the statistical tools for data analysis.	Results analysis	Lectures	Quizzes, Assignments, Exams
11	**1**	To use the statistical tools for data analysis.	Results analysis	Lectures	Quizzes, Assignments, Exams
12	**1**	To know how to merge different sciences field in one project.	How to write your project	Lectures	Quizzes, Assignments, Exams
13	**1**	To know how to merge different sciences field in one project.	How to write your project	Lectures	Quizzes, Assignments, Exams
14	**1**	To understand the concept of scientific research, methodology, methods, and process.	PPT Slides preparation and viva presentation	Lectures	Quizzes, Assignments, Exams
15	**1**	To understand the concept of scientific research, methodology, methods, and process.	PPT Slides preparation and viva presentation	Lectures	Quizzes, Assignments, Exams

11. Course Evaluation

Quizzes (10%), Assignments (10%), Midterm Exam (20%), Final Exam (60%)

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Krishnan Nallaperumal, Engineering Research Methodology, a computer science and Engineering and Information and Communication Technology perspective, First Edition, 2014, New Delhi, India.
Main references (sources)	Krishnan Nallaperumal, Engineering Research Methodology, a computer science and Engineering and Information and Communication Technology perspective, First Edition, 2014, New Delhi, India.
Recommended books and references (scientific journals, reports...)	Kothari CR, Research Methodology-Methods and Techniques, New Wiley Eastern ltd., Delhi, 2009.
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Refrigeration
2. Course Code:
ME 4307
3. Semester / Year:
2nd / 2024-2025
4. Description Preparation Date:
21/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical + 15 Tutorials + 30 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Mohanad Abdulazez Abdulrahem** Email: **Mohanadheete@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• Understand the parts of the vapour compression cycle, and how to analyze and solve the relevant exercises. • Have knowledge of the refrigerants, and the most important properties which must be available in them. • Familiarize the students on how the vapour absorption cycles operate, as well as the procedure to analyze and solve the relevant exercises. • Identify the types of air refrigeration cycles, and how to analyze and solve the relevant exercises. • Have knowledge of the thermoelectric, vortex tube, and steam jet water vapour refrigeration systems

9. Teaching and Learning Strategies

Strategy	The most important strategies that will be adopted in delivering this module are:- - Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. - Incorporate flexible seating into my classroom. - Knowledge application and Extended critical thinking. - Do Summative Assessments Occurs at end of chapter

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Analysis the performance of the vapour compression cycles and understand the most important properties which must be available in the refrigerants.	Introduction and review of basic principles	(Lectures + tutorials + Lab)	Quiz Exam Report
2	3	Analysis the performance of the vapour compression cycles and understand the most important properties which must be available in the refrigerants.	Vapour compression cycle and heat pumps	(Lectures + tutorials + Lab)	Quiz Exam Report
3	3	Analysis the performance of the vapour compression cycles and understand the most important properties which must be available in the refrigerants.	Vapour compression cycle and heat pumps	(Lectures + tutorials + Lab)	Quiz Exam Report
4	3	Analysis the performance of the vapour compression cycles and understand the most important properties which must be available in the refrigerants.	Vapour compression cycle and heat pumps	(Lectures + tutorials + Lab)	Quiz Exam Report
5	3	Estimate the performance parameters of the lithium bromide-water absorption refrigeration cycles for a certain cooling load	Vapour absorption cycle	(Lectures + tutorials + Lab)	Quiz Exam Report
6	3	Estimate the performance parameters of the lithium bromide-water absorption refrigeration cycles for a certain cooling load	Vapour absorption cycle	(Lectures + tutorials + Lab)	Quiz Exam Report
7	3	Estimate the performance parameters of the lithium bromide-water absorption refrigeration cycles for a certain cooling load	Vapour absorption cycle	(Lectures + tutorials + Lab)	Quiz Exam Report
8	3	Apply the laws of thermodynamics on the air refrigeration cycles	Air refrigeration systems	(Lectures + tutorials + Lab)	Quiz Exam Report
9	3	Apply the laws of thermodynamics on the air refrigeration cycles	Air refrigeration systems	(Lectures + tutorials + Lab)	Quiz Exam Report
10	3	Explain the components and the principle of work of the thermoelectric	Thermoelectric refrigeration	(Lectures + tutorials + Lab)	Quiz Exam Report
11	3	Explain the components and the principle of work of the thermoelectric	Thermoelectric refrigeration	(Lectures + tutorials + Lab)	Quiz Exam Report

12	**3**	Explain the components and the principle of work of the vortex tube	Vortex tube refrigeration	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**3**	Explain the components and the principle of work of the vortex tube	Vortex tube refrigeration	(Lectures + tutorials + Lab)	Quiz Exam Report
14	**3**	Explain the components and the principle of work of the steam jet water vapour refrigeration systems	Steam jet water vapour refrigeration system.	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**3**	Explain the components and the principle of work of the steam jet water vapour refrigeration systems	Steam jet water vapour refrigeration system	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams = 20%,
Quizzes = 10%,
HomeWorks and activities = 10%,
Lab = 10%, and
Final course exam = 50%

2. Learning and Teaching Resources

Required textbooks (curricular books, if any	Refrigeration and Air Conditioning by Ahmadul Ameen.
Main references (sources)	Refrigeration and Air Conditioning by S.N. Sapali. Refrigeration and Air Conditioning by C.P. Arora Refrigeration and Air Conditioning by Er. R.K Rajput
Recommended books and references (scientific journals, reports…)	N/A
Electronic References, Websites	None

Course Description Form

1. Course Name:
Design of Machine Elements II
2. Course Code:
- **ME 4306**
3. Semester / Year:
2 nd / 2025
4. Description Preparation Date:
23/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Arz Yahya Rzayyig** Email: arzrzayeg@uoanbar.edu.iq

8. Course Objectives	
Course Objectives	1. To introduce students to the design and theory of common machine elements and to give students experience in solving design problems involving machine elements. 2. To combine forces, moments, torques, stress and strength information to develop ability to analyze, design and/or select machine elements. With attention to safety, reliability, and societal and fiscal aspects. 3. To require the student to prepare professional quality solutions and presentations to effectively communicate the results of analysis and design. 4. To be acquainted with standards, safety, reliability, importance of dimensional parameters and manufacturing aspects in mechanical design.

9. Teaching and Learning Strategies	
Strategy	1. Recognize the fundamentals of the theory of lubrication and journal bearings 2. Design of specific mechanical elements including: gears, gear trains, clutches, coupling, brakes, springs, ropes and chains drives. 3. Recognize the fundamentals of the Rolling-Contact Bearings. 4. Design and evaluation of a machine component that is created to satisfy a specific need. Also, gain an appreciation for and become proficient in applying the final steps of the engineering design process.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	2,4	Mechanical Springs	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
2	4	2,4	Mechanical Springs	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
3	4	2,4	Mechanical Springs	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
4	4	3,4	Rolling-Contact Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
5	4	3,4	Rolling-Contact Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
6	4	3,4	Rolling-Contact Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
7	4	1,4	Lubrication and Journal Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
8	4	1,4	Lubrication and Journal Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
9	4	1,4	Lubrication and Journal Bearings	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
10	4	2,4	Gears-General	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
11	4	2,4	Gears-General	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
12	4	2,4	Spur, Helical, Bevel, and Worm Gears	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
13	4	2,4	Spur, Helical, Bevel, and Worm Gears	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
14	4	2,4	Clutches, Brakes, Couplings, and Flywheels	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
15	4	2,4	Clutches, Brakes, Couplings, and Flywheels	(Lectures + Tutorial)	Quizzes Exams H.W. Reports

1. 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 **Monthly exams =20%,** **Quizzes = 10%,** **Homework and Activities=10%,** **and** **Final course exam= 60%.**	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Mechanical Engineering Design by Shigley, 8th Edition,2008.
Main references (sources)	1. Shigley's Mechanical Engineering Design, 9th Edition, 2011. 2. Shigley's Mechanical Engineering Design, 10th Edition, 2015. 3. Shigley's Mechanical Engineering Design, 11th Edition, 2020.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Design of Machine Elements I

2. Course Code:

- **ME 4301**

3. Semester / Year:

1 st / 2024

4. Description Preparation Date:

23/9/2024

5. Available Attendance Forms:

In-person lectures

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

45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units

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

Name: **Dr. Arz Yahya Rzayyig**
Email: arzrzayeg@uoanbar.edu.iq

8. Course Objectives

Course Objectives	1.To cover the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and characteristics of the principal types of mechanical elements 2.To offer a practical approach to the subject through a wide range of real-world applications and examples 3.To encourage students to link design and analysis 4.To encourage students to link fundamental concepts with practical component specification. 5.To illustrate to students the variety of mechanical components available and emphasize the need to continue learning.

9. Teaching and Learning Strategies

Strategy	1. Apply stress analysis theory and appropriate criteria of failure to the design of simple machine elements 2. Design shafts for static and variable stresses and estimate stress concentration. 3. Design of Screws, Fasteners, and the Design of Nonpermanent Joints. 4. Design of welding, bonding and other permanent joints.

10. Course Structure

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

1	**4**	1	Fundamentals of mechanical engineering design	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
2	**4**	1	Failures Resulting from Static Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
3	**4**	1	Failures Resulting from Static Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
4	**4**	1	Failures Resulting from Static Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
5	**4**	1	Fatigue Failure Resulting from Variable Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
6	**4**	1	Fatigue Failure Resulting from Variable Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
7	**4**	1	Fatigue Failure Resulting from Variable Loading	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
8	**4**	2	Shafts and Shaft Components	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
9	**4**	2	Shafts and Shaft Components	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
10	**4**	3	Screws, Fasteners, and the Design of Nonpermanent Joints	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
11	**4**	3	Screws, Fasteners, and the Design of Nonpermanent Joints	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
12	**4**	3	Screws, Fasteners, and the Design of Nonpermanent Joints	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
13	**4**	4	Welding, Bonding, and the Design of Permanent Joints	(Lectures + Tutorial)	Quizzes Exams H.W. Reports
14	**4**	4	Welding, Bonding, and	(Lectures + Tutorial)	Quizzes Exams H.W.

			the Design of Permanent Joints		Reports
15	**4**	4	Welding, Bonding, and the Design of Permanent Joints	(Lectures + Tutorial)	Quizzes Exams H.W. Reports

1. 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 **Monthly exams =20%,** **Quizzes = 10%,** **Homework and Activities=10%,** **and** **Final course exam= 60%.**	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Mechanical Engineering Design by Shigley, 8th Edition,2008.
Main references (sources)	1. Shigley's Mechanical Engineering Design, 9th Edition, 2011. 2. Shigley's Mechanical Engineering Design, 10th Edition, 2015. 3. Shigley's Mechanical Engineering Design, 11th Edition, 2020.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Air conditioning

2. Course Code:

ME 4302

3. Semester / Year:

1nd / 2024-2025

4. Description Preparation Date:

25/9/2024

5. Available Attendance Forms:

In-person lectures

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

30 theoretical + 15 Tutorials + 30 practical (75 Hours) / 3 Units

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

Name: **Dr. Haitham K. Dawood**
Email: **hathim_iraq@uoanbar.edu.iq**

Name: **Mohanad Abdulazez Abdulrahem**
Email: **Mohanadheete@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	• Explain the properties of moist air and how to calculate each property. • Use the psychrometric chart to find the properties of the moist air, as well as the representation of air conditioning processes. • Encourage students to link with the procedure of simplified estimations of the heating and cooling loads. • Cover the types of air conditioning systems. • Illustrate to students of the methods used to calculate the sizes of air ducts, as well as the overall pressure drop in air ducts system.

9. Teaching and Learning Strategies

Strategy	The most important strategies that will be adopted in delivering this module are:- - Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. - Incorporate flexible seating into my classroom. - Knowledge application and Extended critical thinking. - Do Summative assessments Occurs at end of chapter.

	- Do Formative Assessment occurs through chapter to Covers complete content areas.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Introduction to air conditioning	(Lectures + tutorials + Lab)	Quiz Exam Report
2	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Moist air properties	(Lectures + tutorials + Lab)	Quiz Exam Report
3	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Moist air properties	(Lectures + tutorials + Lab)	Quiz Exam Report
4	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Psychrometric chart and psychrometry processes	(Lectures + tutorials + Lab)	Quiz Exam Report
5	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Psychrometric chart and psychrometry processes	(Lectures + tutorials + Lab)	Quiz Exam Report
6	3	Apply the basic concepts of thermodynamics and the psychrometric chart to evaluate the moist air properties and analysis the air conditioning processes.	Thermal comfort	(Lectures + tutorials + Lab)	Quiz Exam Report
7	3	Evaluate the heating and cooling loads of a building, as well as identify the appropriate indoor and outdoor design conditions of certain applications.	Indoor and outdoor design conditions	(Lectures + tutorials + Lab)	Quiz Exam Report
8	3	Evaluate the heating and cooling loads of a building, as well as identify the appropriate indoor and outdoor design conditions of certain applications.	Heating load calculation	(Lectures + tutorials + Lab)	Quiz Exam Report
9	3	Evaluate the heating and cooling loads of a building, as well as identify the appropriate indoor and outdoor design conditions of certain applications.	Heating load calculation	(Lectures + tutorials + Lab)	Quiz Exam Report
10	3	Evaluate the heating and cooling loads of a building, as well as identify the appropriate indoor and outdoor design conditions of certain applications.	Cooling load calculation	(Lectures + tutorials + Lab)	Quiz Exam Report

11	3	Evaluate the heating and cooling loads of a building, as well as identify the appropriate indoor and outdoor design conditions of certain applications.	Cooling load calculation	(Lectures + tutorials + Lab)	Quiz Exam Report
12	3	Compare the various types of air conditioning systems	Air conditioning systems	(Lectures + tutorials + Lab)	Quiz Exam Report
13	3	Compare the various types of air conditioning systems	Air conditioning systems	(Lectures + tutorials + Lab)	Quiz Exam Report
14	3	Design the air ducts and identify the total pressure drop for the ducting system.	Air distribution systems and duct design	(Lectures + tutorials + Lab)	Quiz Exam Report
15	3	Design the air ducts and identify the total pressure drop for the ducting system.	Air distribution systems and duct design	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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

Monthly exams = 20%,
Quizzes = 10%,
Home Works and activities = 10%,
Lab = 10%, and
Final course exam = 50%

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Refrigeration and Air Conditioning by Ahmadul Ameen.
Main references (sources)	Refrigeration and Air Conditioning by S.N. Sapali. Refrigeration and Air Conditioning by C.P. Arora Refrigeration and Air Conditioning by Er. R.K Rajput
Recommended books and references (scientific journals, reports…)	N/A
Electronic References, Websites	None

Course Description Form

1. Course Name:
Electrical Machines
2. Course Code:
MEC 012
3. Semester / Year:
1nd / 2024-2025
4. Description Preparation Date:
21/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 theoretical +30 practical (60 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Mohanad Abdulazez Abdulrahem** Email: **Mohanadheete@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• Study the DC machines construction (Generator and Motor) and principle of operation. • Understand the various energy losses and efficiencies (mechanical and electrical) of DC Generators. • Understand the various energy losses and efficiencies (mechanical and electrical) as well as the speed control of a DC motor. • Explain the basic construction and operation of different types of transformers with the various energy loss and efficiencies as well as the basic electrical power transmission.

9. Teaching and Learning Strategies

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Identify the constructions and principles of operation of DC generator machines	DC machines construction	(Lectures + tutorials + Lab)	Quiz Exam Report
2	3	Identify the constructions and principles of operation of DC generator machines	Principle of operation of DC generators	(Lectures + tutorials + Lab)	Quiz Exam Report
3	3	Identify the constructions and principles of operation of DC generator machines	Types of DC generators	(Lectures + tutorials + Lab)	Quiz Exam Report
4	3	Apply the basic principles to determine the various energy losses and efficiencies (mechanical and electrical) of DC Generators.	Losses and efficiency of DC generators	(Lectures + tutorials + Lab)	Quiz Exam Report
5	3	Apply the basic principles to determine the various energy losses and efficiencies (mechanical and electrical) of DC Generators.	Parallel operation of DC generators	(Lectures + tutorials + Lab)	Quiz Exam Report
6	3	Identify the constructions and principles of operation of DC motor machines.	Principle of DC motors	(Lectures + tutorials + Lab)	Quiz Exam Report
7	3	Identify the constructions and principles of operation of DC motor machines.	Types of DC motors	(Lectures + tutorials + Lab)	Quiz Exam Report
8	3	Apply the basic principles to determine the various energy losses and efficiencies (mechanical and electrical) as well as the speed control of a DC motor.	DC motors losses, efficiency	(Lectures + tutorials + Lab)	Quiz Exam Report
9	3	Apply the basic principles to determine the various energy losses and efficiencies (mechanical and electrical) as well as the speed control of a DC motor.	Speed control of DC motors	(Lectures + tutorials + Lab)	Quiz Exam Report
10	3	Identify the basic construction and operation of different types of transformers	Transformer construction	(Lectures + tutorials + Lab)	Quiz Exam Report
11	3	Identify the basic construction and operation of different types of transformers	principle of operation of transformer	(Lectures + tutorials + Lab)	Quiz Exam Report
12	3	Identify the basic construction and operation of different types of transformers	Types of transformers ordinary, all-day, and auto	(Lectures + tutorials + Lab)	Quiz Exam Report
13	3	Applying of basic principles to estimate the various energy loss and efficiencies of transformer	Transformer Losses and efficiencies	(Lectures + tutorials + Lab)	Quiz Exam Report

14	**3**	Identify the basics of electrical power transmission	The basic principles of electrical power transmission	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**3**	Identify the basics of electrical power transmission	The basic principles of electrical power transmission	(Lectures + tutorials + Lab)	Quiz Exam Report

1. 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 = 25%,
Online Assignments (HW) = 4%,
Onsite Assignments = 5%,
Lab =6%,
Midterm Exam = 10%,
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Electrical Technology by Theraja.
Main references (sources)	Electric Machinery Fundamentals by S. Chapman.
Recommended books and references (scientific journals, reports…)	N/A
Electronic References, Websites	None

Course Description Form

1. Course Name:
Strength of materials II
2. Course Code:
MEC 010
3. Semester / Year:
2nd / 2025
4. Description Preparation Date:
23/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **DrMazin Yaseen Abbood** Email: **mazin76eng@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	1. Calculate stresses in thin and thick cylinders. 2. Calculate the deflection of determinate and indeterminate beams. 3. Explain and compute the combined stresses in different loading types. 4. Explain the difference between brittle and ductile material in term of failure mode. 5. Compute the factor of safety of different loading types

9. Teaching and Learning Strategies	
Strategy	1. Understand the difference of stresses in thin and thick cylinders. 2. Recognize the difference between deflection of determinate and indeterminate beams. 3. Recognize the difference between the brittle and ductile material in term of failure mode. 4. Draw Mohr's stress circle and computing combine stress in different type of loading

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	1	Deflection of determinate beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
2	3	1	Deflection of determinate beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
3	3	1	Deflection of indeterminate beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
4	3	1	Deflection of indeterminate beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
5	3	1, 3	Deflection of indeterminate beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
6	3	1, 3	Thin cylinders	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
7	3	1, 3	Thin cylinders	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
8	3	1, 3	Thick cylinders	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
9	3	1, 3	Thick cylinders	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
10	3	1, 3	Thick cylinders	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
11	3	1, 3	combined stress	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
12	3	1, 3	combined stress	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
13	3	1, 3	combined stress	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
14	3	1, 3	Theories of failure	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
15	3	1, 3	Theories of failure	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports

1. 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 **Monthly exams =20%,** **Quizzes = 10%,** **Homework and Activities=10%,** **Lab =10%, and** **Final course exam= 50%.**

2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Strength of materials by Beer
Main references (sources)	Ogata, K. (2010). Modern control Mechanics of Materials I,II by E. J. Hearn
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Strength of materials I

2. Course Code:

MEC 006

3. Semester / Year:

1 st / 2024

4. Description Preparation Date:

23/9/2024

5. Available Attendance Forms:

In-person lectures

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

45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units

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

Name: **DrMazin Yaseen Abbood**
Email: **mazin76eng@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	1. Calculate stresses on a member subjected to axial loads 2. Calculate stresses of a member subjected to shear force 3. Explain and compute the mechanical properties of materials. 4. Calculate angular rotation of a shaft subjected to torsional moment. 5. Compute forces, stresses, and bending moments in loaded beams.

9. Teaching and Learning Strategies

Strategy	. Understand the effect of direct and shear force on mechanical parts and the difference between these forces. Drawing the shear force and bending moment diagram and solve the problems that contain bending stress and shear stress. Recognize the difference between direct shear and torsion. Also solving torsion problems in different mechanical parts.

10. Course Structure

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

1	**3**	1	Introduction to Strengths of Materials/Statics Review	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
2	**3**	1	Introduction to Strengths of Materials/Statics Review	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
3	**3**	1	Simple stresses and strains	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
4	**3**	1	Simple stresses and strains	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
5	**3**	1.3	Bending moments and shearing forces	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
6	**3**	1.3	Bending moments and shearing forces	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
7	**3**	1.3	Bending moments and shearing forces	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
8	**3**	1.3	Bending stresses in beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
9	**3**	1.3	Bending stresses in beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
10	**3**	1,3	Shear stress in beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
11	**3**	1.3	Shear stress in beams	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
12	**3**	1,3	Torsion	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
13	**3**	1.3	Torsion	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
14	**3**	1.3	Principal stresses and strains	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports
15	**3**	1.3	Principal stresses and strains	(Lectures + tutorials + Lab)	Quizzes Exams H.W. Reports

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Lab =10%, and
Final course exam= 50%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Strength of materials by Beer
Main references (sources)	Ogata, K. (2010). Modern control Mechanics of Materials I,II by E. J. Hearn
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Calculus I
2. Course Code:
ENG 003
3. Semester / Year:
First semester / 2025
4. Description Preparation Date:
28/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 Tutorial (60 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **DrMazin Yaseen Abbood** Email: **mazin76eng@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	A The student acquires the skill of dealing with mathematical equations and showing the concept of calculus and polar, Cartesian and cylindrical axes. B Clarify the methods of solving integrals and numerical sequences. C- The course aims to study the applications of integration in calculating the lengths of curves, areas and volumes in different coordinates. and some physical applications D- The course aims to give the student a new background that he can benefit from when studying differential equations

9. Teaching and Learning Strategies	
Strategy	A. Knowledge and understanding - Identify the basic concepts of goals, differential equations and methods of solving integrals . - Give the student experience in graphs with polar coordinates. - The student learns how to use integrals to find areas, volumes and lengths of regular objects and irregular . - Identify sequences, convergence mechanism, divergence, series and methods of testing them.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1	Limits :d efinitions and its theorems	(Lectures + tutorials)	Quizzes Exams H.W.
2	4	1	Limits involving radicals, infinite functions , and V. , H. asymptote	(Lectures + tutorials)	Quizzes Exams H.W.
3	4	1	Continuity: definition and its theorems Derivative definition.	(Lectures + tutorials)	Quizzes Exams H.W.
4	4	1	Rule of differentiation. Chain rule, implicit differentiation higher order derivative.	(Lectures + tutorials)	Quizzes Exams H.W.
5	4	1, 2	Applications: related rates. Maximum and minimum, concavity	(Lectures + tutorials)	Quizzes Exams H.W.
6	4	1, 2	Graphs of functions . Mean value, roll's theorem.	(Lectures + tutorials)	Quizzes Exams H.W.
7	4	1, 2	Trigonometric function and their inverse functions	(Lectures + tutorials)	Quizzes Exams H.W.
8	4	1, 2	Integration: definite and indefinite integrals	(Lectures + tutorials)	Quizzes Exams H.W.
9	4	1, 2	Rule of integration	(Lectures + tutorials)	Quizzes Exams H.W.
10	4	1, 2	Applications on definite integral: Area. Volumes	(Lectures + tutorials)	Quizzes Exams H.W.
11	4	1, 2	Applications of define integral; length of a plane curves.	(Lectures + tutorials)	Quizzes Exams H.W.

12	**4**	1, 2	The area of surface of revolution	(Lectures + tutorials)	Quizzes Exams H.W.
13	**4**	1, 2	Mean value theorem, the fundamental theorem	(Lectures + tutorials)	Quizzes Exams H.W.
14	**4**	1, 2	The functions ln(x), exp(x) and their inverse	(Lectures + tutorials)	Quizzes Exams H.W.
15	**4**	1, 2	Spring break	(Lectures + tutorials)	Quizzes Exams H.W.

1. 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, ... etc

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
and
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas'calculus Fourteenth Edition 2014
Main references (sources)	Calculus and Analytic Geometric, Durfee W.H,1971New York .
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Calculus II
2. Course Code:
ENG 004
3. Semester / Year:
Second semester / 2025
4. Description Preparation Date:
28/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 Tutorial (60 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **DrMazin Yaseen Abbood** Email: **mazin76eng@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	**1.** Identify and evaluate functions integral using various techniques of integral. **2.** Evaluate the indefinite and improper integrals by using different integration techniques. **3.** Comparison Test for Improper Integrals. **4.** Evaluate the applications of integrals: Arc Length, Surface area, Parametric Equations and Curves, Tangents with Parametric Equations. **5.** Using Polar Coordinates Technique: Polar Coordinate, Common Polar Coordinate Graphs, Tangents with Polar Coordinates, Curves defined by parametric equations. **6.** Identify Sequences and Series: monotone sequences. Infinite series. The comparison. Ratio and Root tests. Alternating series. **7.** Conditional convergence. Maclaurin and Taylor series and their approximation. Power series.

9. Teaching and Learning Strategies	
Strategy	A. Knowledge and understanding - Identify the basic concepts of goals, differential equations and methods of solving integrals. - Give the student experience in graphs with polar coordinates. - The student learns how to use integrals to find areas, volumes and lengths of regular objects and irregular .

	- Identify sequences, convergence mechanism, divergence, series and methods of testing them.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1	Identify and evaluate functions integral using various techniques of integral.	(Lectures + tutorials)	Quizzes Exams H.W.
2	4	1	Evaluate the indefinite and improper integrals by using different integration techniques.	(Lectures + tutorials)	Quizzes Exams H.W.
3	4	1	Comparison Test for Improper Integrals.	(Lectures + tutorials)	Quizzes Exams H.W.
4	4	1	Evaluate the applications of integrals: Arc Length, Surface area, Parametric Equations and Curves, Tangents with Parametric Equations.	(Lectures + tutorials)	Quizzes Exams H.W.
5	4	1, 2	Using Polar Coordinates Technique: Polar Coordinate, Common Polar Coordinate Graphs, Tangents with Polar Coordinates, Curves defined by parametric equations.	(Lectures + tutorials)	Quizzes Exams H.W.
6	4	1, 2	Identify Sequences and Series: monotone sequences. Infinite series. The comparison. Ratio and Root tests. Alternating series. Conditional convergence. Maclaurin and Taylor series and their approximation. Power series.	(Lectures + tutorials)	Quizzes Exams H.W.
7	4	1, 2	Identify and evaluate functions integral using various techniques of integral.	(Lectures + tutorials)	Quizzes Exams H.W.
8	4	1, 2	Evaluate the indefinite and improper integrals by using different integration techniques.	(Lectures + tutorials)	Quizzes Exams H.W.
9	4	1, 2	Comparison Test for Improper Integrals.	(Lectures + tutorials)	Quizzes Exams H.W.
10	4	1, 2	Evaluate the applications of integrals: Arc Length, Surface area, Parametric Equations and Curves, Tangents with Parametric Equations.	(Lectures + tutorials)	Quizzes Exams H.W.

11	**4**	1, 2	Using Polar Coordinates Technique: Polar Coordinate, Common Polar Coordinate Graphs, Tangents with Polar Coordinates, Curves defined by parametric equations.	(Lectures + tutorials)	Quizzes Exams H.W.
12	**4**	1, 2	Identify and evaluate functions integral using various techniques of integral.	(Lectures + tutorials)	Quizzes Exams H.W.
13	**4**	1, 2	Evaluate the indefinite and improper integrals by using different integration techniques.	(Lectures + tutorials)	Quizzes Exams H.W.
14	**4**	1, 2	Comparison Test for Improper Integrals.	(Lectures + tutorials)	Quizzes Exams H.W.
15	**4**	1, 2	Evaluate the applications of integrals: Arc Length, Surface area, Parametric Equations and Curves, Tangents with Parametric Equations.	(Lectures + tutorials)	Quizzes Exams H.W.

1. 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, ... etc

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
and
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas'calculus Fourteenth Edition 2014
Main references (sources)	Calculus and Analytic Geometric, Durfee . W.H,1971New York
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

Control Systems

2. Course Code:

ME4303E

3. Semester / Year:

2nd / 2024

4. Description Preparation Date:

19/9/2024

5. Available Attendance Forms:

In-person lectures

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

45 theoretical +15 solutions Issues (60 Hours) / 2 Units

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

Name: **Dr. Hamad M. Hasan**
Email: hamad.m.hasan@uoanbar.edu.iq

Name: **Mr. Ahmed Yasin Ali**
Email: ahmed.yasin@uoanbar.edu.iq

8. Course Objectives

Course Objectives	1. The students should understand the mathematical and physical principles underlying the FEA. 2. To provide students with basic skills of FEA programming using MATLAB. 3. The formulation of finite element methods for linear static analysis of solids and structures.

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is the basic fundamentals of the finite element methods. Beginning with simple one-dimensional problem, continuing to two- and three-dimensional elements, and ending with some applications in heat transfer, solid mechanics and fluid mechanics. Covers modelling, mathematical formulation, and computer implementation

10. Course Structure

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

1	**4**	Introduction .	Introduction to FEM	(Lectures + tutorials)	Quiz Exam Report
2	**4**	Bar Element .	Bar Element .	(Lectures + tutorials)	Quiz Exam Report
3	**4**	Beam Element	Beam Element	(Lectures + tutorials)	Quiz Exam Report
4	**4**	Linear static analysis	Linear static analysis	(Lectures + tutorials)	Quiz Exam Report
5	**4**	Two-Dimensional Analysis	Two-Dimensional Analysis	(Lectures + tutorials)	Quiz Exam Report
6	**4**	Finite element for two-dimensional problems	Finite element for two-dimensional problems	(Lectures + tutorials)	Quiz Exam Report
7	**4**	Development of Truss Equations	Development of Truss Equations	(Lectures + tutorials)	Quiz Exam Report
8	**4**	Development of Frame and Grid Equations	Development of Frame and Grid Equations	(Lectures + tutorials)	Quiz Exam Report
9	**4**	Development of the Plane Stress and Plane Strain Stiffness Equations	Development of the Plane Stress and Plane Strain Stiffness Equations	(Lectures + tutorials)	Quiz Exam Report
10	**4**	Isoperimetric Formulation	Isoperimetric Formulation	(Lectures + tutorials)	Quiz Exam Report
11	**4**	Numerical Quadrature, Three-Dimensional Stress Analysis	Numerical Quadrature, Three-Dimensional Stress Analysis	(Lectures + tutorials)	Quiz Exam Report
12	**4**	Finite Element Modelling and Solution Techniques	Finite Element Modelling and Solution Techniques	(Lectures + tutorials)	Quiz Exam Report
13	**4**	Plate Elements	Plate Elements	(Lectures + tutorials)	Quiz Exam Report
14	**4**	Solid Elements for 3-D Elements	Solid Elements for 3-D Elements	(Lectures + tutorials)	Quiz Exam Report
15	**4**	Thermal Analysis	Thermal Analysis	(Lectures + tutorials)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Olek C Zienkiewicz, Robert L Taylor, J.Z. Zhu, *The Finite Element Method: Its Basis and Fundamentals*, Sixth Edition, Butterworth-Heinemann 2005
Main references (sources)	**Olek C Zienkiewicz, Robert L Taylor, J.Z. Zhu, *The Finite Element Method: Its Basis and Fundamentals*, Sixth Edition, Butterworth-Heinemann 2005**
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Engineering Analysis
2. Course Code:
ME3301
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
19/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45 theoretical +15 solutions Issues +15 practical (75 Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Hamad M Hasan** Email: **hamad.m.hasan@uoanbar.edu.iq** Name: **Mr. Ahmed Yasin Ali** Email: **ahmed.yasin@uoanbar.edu.iq**
8. Course Objectives

Course Objectives	• To enhance the student's ability to think logically and mathematically in modelling systems. • To use ordinary differential equation for solving practical problems. • To knowledge the partial differential equations (PDEs) and how they can serve as models for physical processes such as mechanical vibrations, transport phenomena including diffusion, heat transfer, and advection, and electrostatics. • To use Fourier transforms and the convolution theorem to analyze and solve the heat equation. • Select and execute appropriate methods to achieve objectives. • Interpret and communicate the results.

9. Teaching and Learning Strategies	
Strategy	Homogeneous linear equations with constant coefficients; General solutions of lin equations—theory; Initial value problems vs. boundary value problems; Mechan vibrations, fluid flow problems, heat transfer problem; Nonhomogeneous equation undetermined coefficients; Forced oscillations and resonance; Nonhomogene equations—variation of parameters; Nonhomogeneous equations—varia coefficients; Fourier Series; Fourier Cosine and Sine Series; Partial Differer Equations. A Model for Heat Flow; Method of Separation of Variables; The H Equation; The Wave Equation; Laplace's Equation. Functions of complex variab Polar form of a Complex Number. Trigonometric and Hyperbolic Functions- Eul Formula; Cauchy–Riemann Equations- Laplace's Equation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Modeling with Higher Order Linear Differential Equations.	Differential Equations	(Lectures + tutorials)	Quiz Exam Report
2	**4**	Modeling with Higher Order Linear Differential Equations.	Differential Equations	(Lectures + tutorials)	Quiz Exam Report
3	**4**	Modeling with Higher Order Linear Differential Equations	Differential Equations	(Lectures + tutorials)	Quiz Exam Report
4	**4**	Systems of Differential Equations.	Differential Equations	(Lectures + tutorials))	Quiz Exam Report
5	**4**	Systems of Differential Equations	Differential Equations	(Lectures + tutorials)	Quiz Exam Report
6	**4**	Applications of Ordinary Differential Equations	Ordinary Differential Equations	(Lectures + tutorials)	Quiz Exam Report
7	**4**	Applications of Ordinary Differential Equations	Ordinary Differential Equations	(Lectures + tutorials))	Quiz Exam Report
8	**4**	Fourier series	Fourier series	(Lectures + tutorials)	Quiz Exam Report
9	**4**	Fourier series	Fourier series	(Lectures + tutorials)	Quiz Exam Report
10	**4**	Partial Differential Equations.	Partial Differential Equations.	(Lectures + tutorials)	Quiz Exam Report
11	**4**	Partial Differential Equations.	Partial Differential Equations.	(Lectures + tutorials)	Quiz Exam Report
12	**4**	Partial Differential Equations.	Partial Differential Equations.	(Lectures + tutorials)	Quiz Exam Report
13	**4**	Laplace Transformation	Laplace Transformation	(Lectures + tutorials)	Quiz Exam Report
14	**4**	Laplace Transformation.	Laplace Transformation	(Lectures + tutorials)	Quiz Exam Report
15	**4**	Laplace Transformation	Laplace Transformation	((Lectures + tutorials)	Quiz Exam Report

1. 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

Monthly exams =20%,
Quizzes = 10%,
Homework and Activities=10%,
Final course exam= 60%.

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th edition, 2011, John Wiley. 2. Mathematical Methods, by S. M. Yousuf
Main references (sources)	Zill, D., Wright, W. S., & Cullen, M. R. (2011). Advanced engineering mathematics. Jones & Bartlett Learning.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

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

2024

Course Description Form

1. Course Name:

Industrial Engineering and Economic Analysis

2. Course Code:

ENG3310

3. Semester / Year:

2nd / 2024-2025

4. Description Preparation Date:

16/9/2024

5. Available Attendance Forms:

In-person lectures

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

Credit Hours (45,) / Number of Units (2)

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

Dr. Sattar A. Mutlag Email: Satmutt1961@uoanbar.edu.iq

8. Course Objectives

Course Objectives	✓ Understand the basic concepts of industrial engineering and Productivity types, classification, measurement and improvement. ✓ Understand the relationship between a facility layout location and Material handling systems. ✓ Solve the material requirement planning MRP and Bill of material (BOM). Understand the Just in time (JIT) technique, production planning, scheduling problems, & models. Learn about industrial safety and application.

9. Teaching and Learning Strategies

Strategy	Raise the intellectual level of students, which is the importance of industrial engineering when it is reflected on the individual, society and market

10. Course Structure

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

1	**2**	Process of organization design	The Universal Declaration of Process of organization design	(Lectures)	Quizzes, Assignments, Exams
2	2	Product layout flow	Clarifying the meaning of Product layout flow and solve some problems	(Lectures)	Quizzes, Assignments, Exams
3	2	Product layout flow	Clarifying the meaning of Product layout flow and solve some problems	(Lectures)	Quizzes, Assignments, Exams
4	2	Systematic layout planning	Clarifying the meaning of Systematic layout planning and solve some problems	(Lectures)	Quizzes, Assignments, Exams
5	2	Flow process charts	Explanation of the meaning of Flow process charts and the types and divisions of it	(Lectures)	Quizzes, Assignments, Exams
6	2	Bill of material	Explanation of the meaning of BOM and the types it	(Lectures)	Quizzes, Assignments, Exams
7	2	MRP	Clarifying the meaning of MRP and solve some problems	(Lectures)	Quizzes, Assignments, Exams
8	2	Material handling	Explanation of the meaning of Material handling	(Lectures)	Quizzes, Assignments, Exams
9	2	Human engineering	Explanation of the meaning of Human engineering and the types and divisions of it .	(Lectures)	Quizzes, Assignments, Exams
10	2	Quality control and Inspection	Clarifying the meaning of QC and solve some problems.	(Lectures)	Quizzes, Assignments, Exams
11	2	Quality control and Inspection	Clarifying the meaning of QC and solve some problems.	(Lectures)	Quizzes, Assignments, Exams
12	2	Control chart for variables	Clarifying the meaning of QC and solve some problems	(Lectures)	Quizzes, Assignments, Exams
13	2	Control chart for attributes	Clarifying the meaning of QC and solve some problems	(Lectures)	Quizzes, Assignments, Exams
14	2	Industrial safety.	Learn proper Industrial safety and application	(Lectures)	Quizzes, Assignments, Exams
15	2	Industrial safety.	Learn proper Industrial safety and application	(Lectures)	Quizzes, Assignments, Exams

11.	Course Evaluation
Quizzes	(20%), Term Tests (20%), Quizzes. , Final Exam (60%)
12.	Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ 1. Production & Operations Management by Evert E. Adam Jr and Ronald. 2. Production Management by Kieth & Loekyeracy
Main references (sources)	▪ 3. Analysis & Control of Production Systems by Elsayed & Boucher.
Recommended books and references (scientific journals, reports…)	4. Engineering Economy by D. Garmo.
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Calculus III
2. Course Code:
ME2201
3. Semester / Year:
1st / 2024
4. Description Preparation Date:
22/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
45Theoretical +15 Tutorial + (60Hours) / 3 Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Ahmed Ali Najeeb** Email: **ashaab_1977@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	• 1. Perform calculus operations on vector-valued functions, including derivatives, • integrals curvature, displacement, velocity, acceleration, and torsion. • 2. Perform c al cu l u s operations on functions of several variables, including partial • derivatives, directional derivatives, and multiple integrals. • 3. Find extrema and tangent planes. • 4. Solve problems using the Fundamental Theorem of Line Integrals, Green's • Theorem, The Divergence Theorem and Stokes' Theorem. • 5. Apply the computational and conceptual principles to the solutions of real world • problems.

9. Teaching and Learning Strategies	
Strategy	This course provides Advanced topics in calculus, including vectors and vecto valued functions, partial differentiation, Lagrange multipliers, multiple integra and Jacobeans; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Recognize vectors in plane and vectors in space..	Complex Number - Introduction , Algebra of complex number	(Lectures + tutorials)	Quiz + Exam
2	4	Recognize vectors in plane and vectors in space.	2 Complex Number- Point representation of complex numbers, Complex conjugate.	(Lectures + tutorials)	Quiz + Exam
3	4	Do different types of calculus operations of vectors..	Vectors- Three- Dimensional coordinate system, vectors, The Dot and Cross product,	(Lectures + tutorials)	Quiz + Exam
4	4	Do different types of calculus operations of vectors.	Vectors- Lines and planes in space, Cylinders and Quadric surfaces.	(Lectures + tutorials)	Quiz + Exam
5	4	Do different types of calculus operations of vectors.	Vectors- Curve in space and their Tangents, Integrals of vectors functions.	(Lectures + tutorials)	Quiz + Exam
6	4	Do different types of calculus operations of vectors.	Vectors- Arc length in space, Curvature and normal vectors of a curve, Tangential and normal components of acceleration.	(Lectures + tutorials)	Quiz + Exam
7	4	Identify different types of equations of lines, planes and surfaces	Partial differentiation- Definition, Functions of several variables, Limits and continuity in higher dimensions.	(Lectures + tutorials)	Quiz + Exam
8	4	Identify different types of equations of lines, planes and surfaces	Partial differentiation- partial derivatives and gradient vectors, tangent plants and differentials.	(Lectures + tutorials)	Quiz + Exam
9	4	Identify different types of equations of lines, planes and surfaces	Partial differentiation- Extreme value and saddle points, Lagrange multipliers	(Lectures + tutorials)	Quiz + Exam
10	4	Discover limits and continues of function with two variables.	Multiple Integrals- Double and iterated integrals over rectangles, double integrals over general regions.	(Lectures + tutorials)	Quiz + Exam
11	4	Discover limits and continues of function with two variables.	Multiple Integrals- Area by double integration, Triple integrals in rectangular coordinates.	(Lectures + tutorials)	Quiz + Exam
12	4	Discover limits and continues of function with two variables.	Integration in vector fields, vector field and line integrals, Green's theorem in the plane, Stokes's Theorem, the divergence Theorem	(Lectures + tutorials)	Quiz + Exam

13	**4**	. Identify the first and higher order partial derivatives partial derivatives.	Ordinary differential equations, Classify differential equation by order linear and homogenous.	(Lectures + tutorials)	Quiz + Exam
14	**4**	. Identify the first and higher order partial derivatives partial derivatives.	First order linear differential equations separation, exact	(Lectures + tutorials)	Quiz + Exam
15	**4**	. Identify the first and higher order partial derivatives partial derivatives.	First order linear differential equations- Bernoulli equation, Applications	(Lectures + tutorials)	Quiz + Exam

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20% and three-hour final course exam= 60%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	▪ المقرر Calculus, by Thomas, G.B., Finney, R.L., Weir, M.D. and Giordano, F.R., 2003. ▪ اخرى
Main references (sources)	
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

COMPUTATIONAL FLUID DYNAMICS

2. Course Code:

ME 4301E

3. Semester / Year:

1st / 2024

4. Description Preparation Date:

19/9/2024

5. Available Attendance Forms:

In-person lectures

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

15 theoretical +15 Tutorial + 30 practical (60 Hours) / 2 Credit Hours

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

Name: **Dr. SAAD MOHAMMED JALIL**
Email: saad.jalil@uoanbar.edu.iq

8. Course Objectives

Course Objectives	• Analyze mathematically the governing equations for fluid flow and heat transfer. • Improve skills in computational fluid dynamics to address engineering problems. • Study applying finite difference method in solving different types of Partial Differential Equations (PDEs) that describe different fluid dynamics and heat transfer problems. • Practice using ANSYS FLUENT in design, meshing, and solving various CFD applications.

9. Teaching and Learning Strategies

Strategy	The course is an introductory course to computational fluid dynamics undergraduate students. The finite difference method will be used to so different types of Partial Differential Equations that describe various fl dynamics and heat transfer problems. The discretization, stability, and er analysis are elaborated. A commercial code ANSYS will be used to solve Naiv Stokes (NS) equations for incompressible flow.

10. Course Structure

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

1	**4**	To understand basic concepts of computational methods.	Introduction to Computational Fluid Dynamics	(Lectures + tutorials + Lab)	Quiz Exam Report
2	**4**	To understand basic concepts of computational methods.	Mathematical Modelling	(Lectures + tutorials + Lab)	Quiz Exam Report
3	**4**	To understand basic concepts of computational methods.	Mathematical Classification of Partial Differential Equations	(Lectures + tutorials + Lab)	Quiz Exam Report
4	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	Boundary Conditions	(Lectures + tutorials + Lab)	Quiz Exam Report
5	**4**	To model and simulate numerically different practical fluid flow and heat transfer applications by Ansys.	NUMERICAL MODLEING AND SIMULATION	(Lectures + tutorials + Lab)	Quiz Exam Report
6	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	Discretization Method: Finite Difference Methods.	(Lectures + tutorials + Lab)	Quiz Exam Report
7	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	FDM first order and second orders	(Lectures + tutorials + Lab)	Quiz Exam Report
8	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	FDM first order and second orders	(Lectures + tutorials + Lab)	Quiz Exam Report
9	**4**	To model and simulate numerically different practical fluid flow and heat transfer applications by Ansys.	NUMERICAL MODLEING AND SIMULATION	(Lectures + tutorials + Lab)	Quiz Exam Report
10	**4**	To model and simulate numerically different practical fluid flow and heat transfer applications by Ansys.	NUMERICAL MODLEING AND SIMULATION	(Lectures + tutorials + Lab)	Quiz Exam Report
11	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	Accuracy, Consistency, Stability and Convergence.	(Lectures + tutorials + Lab)	Quiz Exam Report
12	**4**	To characterize the partial differential equations numerically by applying Tylor series techniques.	NONLINEAR PROBLEMS	(Lectures + tutorials + Lab)	Quiz Exam Report
13	**4**	To apply various discretization methods for 1D and 2D problems.	NONLINEAR PROBLEMS	(Lectures + tutorials + Lab)	Quiz Exam Report

14	**4**	To apply various discretization methods for 1D and 2D problems.	Irregular shapes	(Lectures + tutorials + Lab)	Quiz Exam Report
15	**4**	To apply various discretization methods for 1D and 2D problems.	Irregular shapes	(Lectures + tutorials + Lab)	Quiz Exam Report

1. Course Evaluation	
Two monthly exams (1 hour) =10% for each one, homework and quizzes = 15%, Lab (ANSYS) =15%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	▪ Hoffmann, K. A. (1989): Computation fluid dynamics for engineers. A publication of engineering education system TM, Austin, Texas 78713, USA. ▪ Anderson, J. D. Jr. (1995): Computation fluid dynamics, the basic with applications, McGraw-Hill, New York. ▪ Boss, T. K. (1997): Numerical fluid dynamics, Narosa Publishing House, New Delhi. ▪ Computational Fluid Mechanics and heat transfer, John C. Tannehill et al., 1997.
Main references (sources)	▪ Computational Fluid Dynamics, An Introduction, John F. Wendt (Ed.), 2009.
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:
Engineering Mechanics-II (Dynamics)
2. Course Code:
MEC 002
3. Semester / Year:
2nd / 2024
4. Description Preparation Date:
22/9/2024
5. Available Attendance Forms:
In-person lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Theoretical +15 Tutorial (45Hours) / 2Credit Hours
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. AHMED N. UWAYED** Email: **ahmed.noori@uoanbar.edu.iq**

8. Course Objectives	
Course Objectives	• To promote an understanding of the fundamentals of engineering mechanics: dynamics of particles, and rigid bodies in two and three dimensions including: kinematics and kinetics of particles and rigid bodies in 2D and 3D motion, rotations, translations, oscillations. • To develop the ability to apply Newtonian mechanics to model and predict the responses of simple dynamical system (particle and rigid body) subjected to applied forces.

9. Teaching and Learning Strategies	
Strategy	Lecture-based instruction, technology-based learning, individual and group learning, inquiry-based learning, and expeditionary learning are some examples of teaching methodologies.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	Understanding basics of the dynamics	Rectilinear Kinematics: Continuous Motion	(Lectures + tutorials + Homework)	Quiz Exam Report
2	**3**	Understand and be able to apply Newton's laws of motion.	Rectilinear Kinematics: Continuous Motion	(Lectures + tutorials + Homework)	Quiz Exam Report
3	**3**	Understand and be able to apply other basic dynamics concepts - the Work-Energy principle	Kinetics of a Particle: Force and Acceleration	(Lectures + tutorials + Homework)	Quiz Exam Report
4	**3**	Understand and be able to apply other basic dynamics concept Impulse-Momentum principle and the coefficient of restitution.	Kinetics of a Particle: Force and Acceleration	(Lectures + tutorials + Homework)	Quiz Exam Report
5	**3**	Understanding basics of the dynamics	Kinetics of a Particle: Force and Acceleration	(Lectures + tutorials + Homework)	Quiz Exam Report
6	**3**	Understand and be able to apply Newton's laws of motion.	Kinetics of a Particle: Work and Energy	(Lectures + tutorials + Homework)	Quiz Exam Report
7	**3**	Understand and be able to apply other basic dynamics concepts - the Work-Energy principle	Principle of Work and Energy	(Lectures + tutorials + Homework)	Quiz Exam Report
8	**3**	Understand and be able to apply other basic dynamics concept Impulse-Momentum principle and the coefficient of restitution.	Principle of Work and Energy for a System of Particles	(Lectures + tutorials + Homework)	Quiz Exam Report
9	**3**	Understanding basics of the dynamics	Power and Efficiency	(Lectures + tutorials + Homework)	Quiz Exam Report
10	**3**	Understand and be able to apply Newton's laws of motion.	Conservation of Energy	(Lectures + tutorials + Homework)	Quiz Exam Report
11	**3**	Understand and be able to apply other basic dynamics concepts - the Work-Energy principle	Principle of Linear Impulse and Momentum	(Lectures + tutorials + Homework)	Quiz Exam Report
12	**3**	Understand and be able to apply other basic dynamics concept Impulse-Momentum principle and the coefficient of restitution.	Impact	(Lectures + tutorials + Homework)	Quiz Exam Report

13	**3**	Understanding basics of the dynamics	Angular Momentum	(Lectures + tutorials + Homework)	Quiz Exam Report
14	**3**	Understand and be able to apply Newton's laws of motion.	Angular Momentum	(Lectures + tutorials + Homework)	Quiz Exam Report
15	**3**	Understand and be able to apply other basic dynamics concepts - the Work-Energy principle	Rotation about a Fixed Axis	(Lectures + tutorials + Homework)	Quiz Exam Report

1. Course Evaluation	
Quizzes = 25 %, Homework + Report = 10%, Classwork = 5%, Midterm exam = 10%, and three-hour final course exam= 50%).	
2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	R.C. Hibler, Engineering Mechanics: Dynamics, Prentice Hall, 12th ed., 2010.
Main references (sources)	R. C. Hibbeler, "Engineering Mechanics - Dynamics " 13th Edition, 2012
Recommended books and references (scientific journals, reports…)	**None**
Electronic References, Websites	**None**

Course Description Form

1. Course Name:

English Language-IV

2. Course Code:

ME 4101

3. Semester / Year:

1st / 2024

4. Description Preparation Date:

22/9/2024

5. Available Attendance Forms:

In-person lectures

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

30Theoretical (30Hours) / 2 Credit Hours

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

Name: **Dr. AHMED NOORI UWAYED**
Email: **ahmed.noori@uoanbar.edu.iq**

8. Course Objectives

Course Objectives	• To enable students to acquire and understand the English language in both spoken and written form. • To help the students improve their reading skills and learn practical English.

9. Teaching and Learning Strategies

Strategy	In general, this course (English language) is devoted to achieve the academic oral and written communication to the standard required at university level. Within this course, all of essential English skills (Reading, Listening, Speaking and writing) are developed. An integrated syllabus, motivating topics and clearly focused tasks together with what has done in classroom enable students to apply critical thinking skills to a wide range of challenging subjects from diverse scientific disciplines. Course activities include writing different types of topics (academic reports, emails& letters and so on), acquiring advanced academic vocabulary, and getting involved in group discussions and debates. In addition, the course also includes other skills to consolidate the main skills, such as further readings in mechanical engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Develop academic essay writing proficiency.	Unit 1: No place like home	(Lectures)	Quiz Exam
2	**2**	Promote reading skills	Unit 1: No place like home	(Lectures)	Quiz Exam

3	**2**	Expand academic vocabulary through reading	Unit 2: Been there, done that!	(Lectures)	Quiz Exam
4	**2**	Promote speaking ability through group discussions and debates	Unit 2: Been there, done that!	(Lectures)	Quiz Exam
5	**2**	Promote critical thinking skills	Reading and comprehensive	(Lectures)	Quiz Exam
6	**2**	Develop academic essay writing proficiency.	Unit 3: What a story!	(Lectures)	Quiz Exam
7	**2**	Promote reading skills	Unit 3: What a story!	(Lectures)	Quiz Exam
8	**2**	All of outcomes	Presentation	(Lectures)	Quiz Exam
9	**2**	All of outcomes	Presentation	(Lectures)	Quiz Exam
10	**2**	Develop academic essay writing proficiency.	Unit 4: Nothing but the truth	(Lectures)	Quiz Exam
11	**2**	Promote reading skills	Unit 4: Nothing but the truth	(Lectures)	Quiz Exam
12	**2**	Expand academic vocabulary through reading	Unit 5: An eye to the future	(Lectures)	Quiz Exam
13	**2**	Promote speaking ability through group discussions and debates	Unit 5: An eye to the future	(Lectures)	Quiz Exam
14	**2**	Promote critical thinking skills	Unit 6: Making it big	(Lectures)	Quiz Exam
15	**2**	Develop academic essay writing proficiency.	Unit 6: Making it big	(Lectures)	Quiz Exam

1. Course Evaluation

Two monthly exams (1 hour) =10% for each one, homework and quizzes = 20%, and three-hour final course exam= 60%).

2. Learning and Teaching Resources

Required textbooks (curricular books, if any)	▪ John & Liz Soars, "New Headway Plus- Upper mediate Student's Book", 10th ed 2014. ▪ John & Liz Soars, "New Headway Plus- Upper mediate Workbook with key", 10th ed 2014.
Main references (sources)	**None**
Recommended books and references (scientific journals, reports…)	▪ Eric H. Glendinning "English in Mechanical Engineering"
Electronic References, Websites	**None**