Academic program description

A brief summary of the main features of the program and its courses, indicating the skills that students are working to acquire based on the objectives of the academic program and according to the learning outcomes expected of the student, demonstrating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the progr

1.**Educational institution**	University of Maysan
2.**Scientific Department/Center**	Department of Mechanical Engineering
3.**Name of academic or professional program**	Mechanical Engineering Department Curricula for all levels
4.**Final Certificate Name**	Bachelor of Mechanical Engineering
5.**The head system**	Bologna Path+ Semester
6.**Accredited Certification Program**	ABET
7.**Other external influences**	Field and scientific visits
8.**Description preparation date**	July-2024

9.**Academic Program Objectives**

1- Preparing highly educated, qualified and distinguished mechanical engineers to support the labor markets, both governmental and private, and cover their needs for engineering cadres and train them to apply the acquired knowledge and skills to solve real problems.

2- Providing distinguished academic programs in the field of mechanical engineering, both theoretical and practical, that comply with international standards of academic quality and meet the needs of the labor market.

3- Moving towards e-learning, blended learning and encouraging self-education.

4- Arrows in refining the student's personality and preparing him in a distinguished and appropriate manner by providing a teaching environment that depends on simulating traditional teaching by following modern educational methods and

5- Contributing to spreading scientific culture through cooperation with local institutions and various ministries and holding seminars, lectures and courses (in-person and online).

6- Encouraging faculty members in the department to produce innovative scientific research and participate in local and state scientific conferences, specialized and general seminars.

7- Keeping pace with scientific developments in the field of mechanical engineering.

8- Creating a stimulating environment to enhance the knowledge and skills of faculty members in the

9- educational and research fields. Establishing and strengthening effective partnerships with governmental and private sectors and

10.**Required program outcomes, teaching, learning and assessment methods**

A- Cognitive objectives

A1- Knowledge and understanding of the basics of mechanical engineering

A2- The ability to apply knowledge in mathematics, science and engineering.

A3- Developing students' mental abilities by expanding their cognitive horizons in all mechanical engineering specializations. A4- Developing the ability to identify and analyze engineering problems.

A5- Applying theoretical concepts, engineering rules and laws and using the necessary modern techniques, skills and tools. To practice engineering.

A6- The ability to understand the applicable regulations and professional standards of the profession.

B- The program's skill objectives

B1-Ability to detect and solve problems in modern ways

B2- The ability to supervise or implement various mechanical engineering works efficiently. B3- Using realistic examples and matching them with theoretical study.

B4- Ability to think critically and solve problems that arise during project implementation.

B5- Ability to prepare scientific reports accurately and read engineering drawings effectively. B6- Ability to keep up with the latest developments in engineering materials and implementation methods

Teaching and learning methods

1- Providing explanation and clarification through lectures and discussions.

2- Using projectors to present scientific materials, such as Atta Show, smart boards, and plasma screens. 3- Enhancing self-learning through homework and small projects integrated into lectures.

4- E-learning within the university.

5- Conducting experiments and training in laboratories and preparing reports for the experiments. 6- Completing graduation projects as comprehensive field learning projects.

7- Organizing scientific visits to enrich practical experiences. 8- Holding seminars within the department.

9- Implementing summer training programs. 10- Engineering workshops

Evaluation methods

1- Daily exams.

2- Semester exams.

3- Reports and small projects within the message.

4- Discussions and interaction within the lecture.

5- Surprise written and oral tests.

6- Asking questions during lectures and giving marks to the student. 7- Homework.

8- Final exams.

C-Emotional and value goals

A-1 Attention: Arousing students' attention through questions during the lecture.

A-2 Answer: Monitor the extent of the student's interaction with the material displayed on the screen. A-3 Interest: Monitor the interest of the student who interacted more with the material displayed.

C-4 Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

C-5 Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level of morality, and does not become lazy or restless.

Evaluation methods

1- Active participation in the lecture hall is evidence of the student's commitment and responsibility.

2- Commitment to the specified deadline for submitting the assignments and research required of the student. **3-**Midterm and final exams reflect commitment, knowledge and skill achievement.

D- General and transferable skills (other skills related to employability and personal development). D1- Developing the student's ability to deal with technical means.

D2- Developing the student's ability to deal with the Internet. D3- Developing the student's ability to deal with various media. D4- Developing the student's ability to dialogue and discuss
11.**Planning for personal development**
1- Developing students' self-learning skills through the nature of the core subjects, curricula, and approved teaching methods. 2- Encouraging students to work as teams within practical projects that reflect the reality of society and address its problems. **3-**Encourage students to participate in competitions, seminars and conferences to enhance their research skills and increase their confiden On self learning.
12.**Admission criteria (establishing regulations related to admission to the college or institute)**
The Department of Mechanical Engineering is subject to the mechanism of the Ministry of Higher Education and Scientific Research - Central Admissions Department, where graduates of the preparatory study (scientific branch) are nominated for admission to the department based on their graduation rates. In addition, students are accepted in the parallel morning study. Some students are also accepted from the top ten graduates of technical institutes, as well as from the top five percent of graduates of vocationa
13.**The most important sources of information about the program**
1. Websites of Iraqi and state universities. 2. Academic and scientific libraries. 3. Workshops organized by the Ministry of Higher Education, as well as the Ministry's standards. 4. American Academic Accreditation Program (ABET).

14.**Program Structure: The Bachelor of Mechanical Engineering program includes the following courses:**

Hours per week					The name	Code	Semester	No.
tur	Pr (hr/w)	lab	thu	Total				
			4	4	Mathematics I	E111	First semester	1
1			4	5	Static Engineering Mechanics	ME112		2
			2	6	Principles of Production Engineering	ME113		3
			2	2	Chemistry	E117		4
	4		2	6	Engineering Drawing	E124		5
				2	Democracy and Human Rights	U218		6
			4	4	English Language	U128		7
			4	4	Mathematics II	E121	Second semester	1
1			3	4	Kinetic Engineering Mechanics	ME122		2
	1		2	3	Engineering Workshops	ME123		3
			2	2	Physics	E127		4
2		2	4	8	Electrical Engineering	ME126		5
	3		2	5	Fundamentals of Computer and Programming	U123		6
1			3	4	Engineering Mathematics I	E211	Third semester	1
1			2	3	Fluid Mechanics (Statics)	ME212		2
1			2	3	Thermodynamics I	ME213		3
	3		2	5	Engineering Metals I	ME214		4
1		3	2	6	Mechanics of Materials	ME215		5
	2		1	3	Mechanical Drawing I	ME216		6
			2	2	Computer Programming			7
	2		2	4	Engineering Mathematics II	ME217		8
1			3	4	Fluid Mechanics (Dynamics)	E221	Fourth semester	1
1		3	2	6	Thermodynamics II	ME222		2
1		3	2	6	Engineering Metals II	ME223		3

			2	2	Resistance of Materials	ME224		4
1			2	3	Mechanical Drawing II	ME225		5
	2		1	3	Advanced Programming	ME226		6
		2	2	4	Engineering Analysis	ME227		6
1			3	4	Heat Transfer I	E311	Fifth semester	1
1			3	4	Theory of Machines	ME312		2
1		3	2	6	Internal Combustion Engines I	ME313		3
1		3	2	6	Gas Dynamics	ME314		4
1			2	3	Electrical Machines I	ME315		5
1			2	3	Manufacturing Processes I	ME316		6
	3		2	5	Numerical Analysis	ME317		7
1		2	2	5	Heat Transfer II	E321	Sixth semester	1
1		3	2	6	Theory of Machines	ME322		2
1			2	3	Internal Combustion Engines II	ME323		3
1			2	3	Turbomachinery	ME324		4
1		3	2	6	Electrical Machines II	ME325		5
1	2		2	5	Manufacturing Processes II	ME326		6
			2	2	Machine Parts Design I	ME327		7
1		3	3	7	Control Systems	ME411	Seventh semester	1
1			2	3	Air Conditioning and Cooling I	ME412		2
1	3		2	6	Engineering Materials	ME413		3
			2	2	Vibration Theory	ME414		4
1			2	3	Power Stations I	ME415		5
1			2	3	Industrial Engineering	ME416		6
			2	2	Engineering Project	ME417		7
	3		2	5	Machine Parts Design II	ME418		8
1			3	4	Measurements	ME421	Eighth semester	1
1		3	2	6	Air Conditioning and Cooling II	ME422		2
1			2	3	Failure of Engineering Materials	ME423		3

			2	2	**Vibration Applications**	**ME424**		**4**
1	**3**		**2**	**6**	**Power Stations II**	**ME425**		**5**
1		**3**	**2**	**6**	**Project Management**	**ME426**		**6**
			2	**2**	**Engineering Project**	**ME427**		**7**
	3			**3**	**Mathematics I**	**ME429**		**8**

	Engineering drawing	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	The nucleus language	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	mathematics	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Mechanical Engineering Motion	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering workshops	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	The shade	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Electrical Engineering	Support	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Principles of computer science	Bar magazine	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Democracy and human rights	Si support	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering mathematics	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Static fluid mechanics	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
Second	thermodynamics	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering Metals	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Mechanics of materials	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Mechanical drawing	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓

	computer programming	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering mathematics	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Fluid mechanics	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Thermodynamics	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	material resistance	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering Metals	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Baath Party Crimes	Support	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering analysis	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Heat transfer	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Theory of the lit	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
Third	combustion engines brother for me	Specialization	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Gas dynamics	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Electrical machines	Support	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Manufacturing processes	basis	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓

	Numerical analysis	specialty				
	Heat transfer	specialty				
	Machine theory	specialty				
	combustion engines brother for me	Specialization				
	Turbine machines	specialty				
	Electrical machines	Support				
	Manufacturing processes	basis				
Fourth	Machine parts design	specialty				
	Air conditioning and refrigeration	specialty				
	Power stations	specialty				
	vibration theory	specialty				
	control	specialty				
	Engineering materials	specialty				
	Industrial Engineering	specialty				

	Engineering Project	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Machine parts design	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Air conditioning and refrigeration	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Vibration applications	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Power stations	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Measurements	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Project management	Support	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓
	Engineering Project	specialty	✓✓✓✓	✓✓✓✓	✓✓✓✓✓	✓✓✓✓

Course Description

This description provides a brief overview of the main elements of the course and the academic outcomes that the ideal student is expected to achieve when taking advantage of the educational opportunities available. This description should be compared with the academic program description to determine compatibility and compliance between them.

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: MathematicsCourse code: / E111

4. Available forms of attendance: in-person or online

5. Chapter/Year First Semester/First Stage

6. Total number of vertical hours (150) hours.

7.**Date of preparation of this description: July**2024

8. Course objectives:

Mathematics contributes to the core of engineering and serves as a source of knowledge from which engineering students can draw. Therefore, engineering students must have the ability to apply mathematical knowledge and skills to solve engineering design problems. Merely having mathematical or engineering knowledge without understanding how to apply the strategies acquired can limit a student's ability to provide a valid answer.

9. Course outcomes, teaching, learning and assessment methods:

After completing this course, students will be able to understand basic mathematical principles and be able to deal with many derivative problems, making them qualified to understand new, more complex topics.

A- Cognitive objectives

A1- Studying the Cartesian axes and the basics of analytical

geometry. A2- Learning a set of methods for drawing the parent using different techniques.

A3- Using the concept of purpose, approximation and approximation to consolidate and understand the concept of mathematical diffe

A4- Using the concept of purpose to explain the concept of differentiation and derivatives. B-**Course specific skill objectives**.

B1- Apply quantitative and numerical methods to solve engineering problems.

B2- Use basic knowledge to research new technologies.

B3- Deriving and evaluating the information needed to apply engineering analysis methods to unfamiliar problems.

Teaching and learning methods

- Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills The issues are further developed by a set of problems prepared by the lecturers through small study groups and all work submitted is evaluated and responded to.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- Answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction Request other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion about the topic. Displayed and defended.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in The Messenger is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D- General and transferable skills (other skills related to employability and personal development). D1- Developing the student's ability to do homework and submit it on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4- Developing the student's ability to deal with modern technology, especially the Internet. **10.**

Course structure

1 week	The absolute value function Sums, differences, products, quotients
2 weeks	composition of functions The definition of functions, Domains, and
3 weeks	Ranges

4 weeks The graph of functions

5 weeks The inverse of trigonometric functions The trigonometric

Week 6 functions. The graph of the functions

Week 7 Continuous functions Limit

Week 8 involving infinity The Limits

Week 9 and Continuity

10 weeks Differentiation

Week 11 Derivatives of trigonometric functions Implicit

Week 12 Differentiation and the higher derivatives

Week 13 The chain rule

Week 14 Hyperbolic functions, Exponential Functions, Rules and .and logax), Derivative and Integration the Exponential Function Exponential Function, The Exponential Function for Bases other Than (e) (ax Properties of the Exponential Functions, The Derivative and Integration of

Week 15 Integration

Basic integration rules, integration of trigonometric functions, area under a curve, natural logarithmic function, derivative and integral of natural logarithmic function.

Week 16 Preparatory week before the final exam

11. Infrastructure

A- Required textbooks: Primary sources and references

1- Thomas' Calculus, G B. Thomas, RLFinney, MD Weir, Addison - Wesley; 12th Edition, 2010

2- Any other Calculus and analytic geometry textbook

A- Electronic references, Internet sites, reliable websites. B- Library websites in some international universities.

12. **Curriculum Development Plan**

There is no intention to develop the curriculum currently, because the materials that this curriculum depends on are considered a foundation and an indispensable introduction to the different stages and to many lessons, and the development of the curriculum depends primarily on developing the curricula of the subsequent stages for some of the engineering vertica

Course Description

This description provides a brief overview of the main elements of the course and the academic outcomes that the ideal student is expected to achieve when taking advantage of the educational opportunities available. This description should be compared with the academic program description to determine compatibility and compliance between them.

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Static Engineering Mechanics / Course Code: ME112

4. Available forms of attendance: in-person or online

5. Chapter/Year First Semester/First Stage

6. Total number of vertical hours (125) hours.

7. Date of preparation of this description: July 2024

8. Course objectives:

Preparing and qualifying specialized engineers to meet the requirements of the labor market in the private and public sectors in static mechanics by diversifying learning and teaching methods, training students and applying the acquired knowledge and skills to solve real problems. Providing distinguished academic programs in the field of static mechanics, both theoretically and practically, to comply with the international standards of academic quality and meet the needs of the labor market. Encouraging and developing scientific research in the fields of static mechanics in general, and studying and analyzing loads (such as forces, in physical systems in a state of static equilibrium). Creating a stimulating environment for faculty members to develop educational and research knowledge and skills. Building and developing partnerships with the

9. Course outcomes, teaching, learning and

assessment methods A- Knowledge and understanding

A1- Practice the basic skills of analyzing simple mechanical systems. A2-

Acquire skills in analyzing mechanical systems in a state of steady equilibrium.

A3- Acquiring basic skills in learning the free body diagram and choosing an appropriate coordination system.

A- Subject-specific skills B1- The ability to analyze mechanical systems.

B2- The ability to think about solving a specific problem or issue. B3- Solving mechanical problems.

B4- The ability to gain experience in dealing with mechanical systems.

Teaching and learning methods

- Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills It is further developed by a set of problems prepared by the lecturers through small study groups and all work submitted is evaluated and responded to.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D- General and transferable skills (other skills related to employability and personal development). D5- Developing the student's ability to do homework and submit it on time. D6- Logical and programming thinking to find programming solutions to various problems. D7- Developing the student's ability to dialogue and discuss.

D8- Developing the student's ability to deal with modern technology, especially the Internet. **10.**

Course structure

1 week	Couple and moment Resolution
2 weeks	of forces in space Fundamental
3 weeks	Concepts of static

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

11. Infrastructure:

1- Required textbooks

1- Higdon

2- Meriam

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, reliable websites, websites of libraries of some international universities. B- Electronic references, Internet websites.

Course Description

This description provides a brief overview of the main elements of the course and the academic outcomes that the ideal student is expected to achieve when taking advantage of the educational opportunities available. This description should be compared with the academic program description to determine compatibility and compliance between them.

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Principles of Production Engineering / Course Code: ME113

4. Available forms of attendance: in-person or online

5. Chapter/Year First Semester/First Stage

6. Total number of vertical hours (150) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main objective is that the graduate mechanical engineer can deal with methods, applications, problems, calculations and designs related to engineering materials, manufacturing processes and welding techniques.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Cite engineering materials sources.

A2- Explain the principles of production processes, how to choose the type of engineering material and the procedures used to manufacture a specific product. A3- Define engineering effort and engineering reaction.

A4- Define the mechanical properties of materials such as tensile strength, ductility,

toughness and hardness A5- Naming and describing hardness testing techniques

A6- Naming and describing the two shock fracture

testing techniques A7- Explaining the types of different metal production processes and their performance

A8- Describe recrystallization in terms of the change in the microstructure and mechanical properties of the material.

A9- Naming and brief description of some important types of welding operations

A10- Name and describe the forming processes used to form polymers and ceramics.

B- The course's specific skill objectives

B1- Perform some calculations related to finding the force and energy for metal forming processes such as rolling and extrusion. B2- Identify the different manufacturing processes.

Teaching and learning methods

• Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills It is further developed by a set of problems prepared by the lecturers through small study groups and all work submitted is evaluated and responded to.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

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A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Enhancing the student's ability to analyze and think critically through evaluating different engineering processes. D2- Developing teamwork and cooperation skills in practical projects.

D3- Developing effective communication skills through discussing projects and giving presentations. D4- Gaining the ability to research and investigate information from various sources.

10. Course structure

1 week Extraction and Production of Ferrous Metals: Production of iron

2 weeks Engineering Materials, Mechanical Properties of Materials

and steel

3 weeks Extraction and Production of Non-Ferrous Metals: Production of Aluminum, Copper and Zinc

4 weeks Wire and Tube Drawing Extrusion Processes,

5 weeks Analysis of Extrusion Flat Rolling and Its

Week 6 Analysis Rolling/ Types of Rolling Mills Hot

Week 7 and Cold Working Processes Metal Forming

Week 8 Processes

Week 9

10 weeks Deep Drawing

Week 11 Polymer Forming Techniques Gas Welding Process, Arc Welding and

Week 12 Electric Resistance Welding Welding Processes/ Fusion Welding and

Week 13 Pressure Welding

Week 14 The preparatory week before the final

Week 15 exam Ceramic Forming Techniques.

Week 16 Plastic Forming Techniques

Lab Syllabus

Week 1 Lab 2: Tension Test Lab 1: Mechanical

2 weeks Properties of Materials

3 weeks Lab 3: Hardness Test

4 weeks	Lab 4: Impact test
5 weeks	Lab 6: Extrusion Processes Lab 5: Metal
Week 6	Forming Processes: Rolling
Week 7	Lab 10: Deep Drawing Lab
Week 8	9: Tube Drawing Lab 8:
Week 9	Wire Drawing Lab 7:
10 weeks	Drawing Processes
Week 11	Lab 13: Plastic Forming Techniques Lab 12:
Week 12	Welding Processes - Pressure welding Lab 11:
Week 13	Welding Processes - Fusion welding
Week 14	Lab 15: Final examination Lab 14:
Week 15	Ceramic Forming Techniques

11. Infrastructure:

1- Required textbooks

1. Materials Science and Engineering an Introduction, William D. Callister, JR. and David G. Rethwisch.
2. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities. B- Electronic references, Internet websites)

12. Curriculum Development Plan

Review of the vertical materials: The vertical materials are updated periodically to include the latest theories and

techniques in production engineering. And the inclusion of new topics such as digital manufacturing, Industry 4.0, and advanced productio

Use of Technology: Integrating technological tools such as simulation, virtual reality, and engineering software into

teaching.

Blended learning: Using a combination of traditional and e-learning to enhance the learning

experience. Augmented practical workshops: Organizing intensive practical workshops to enhance students' practical experience.

Applied projects: Encouraging students to implement applied projects that reflect real-world challenges in the field of

production engineering.

Research Skills: Enhance research and investigation skills by assigning students research projects and scientific reports.

Critical Thinking: Organize discussions and case studies to enhance critical and analytical thinking skills.

Partnerships with institutions: Building partnerships with industrial institutions to provide training opportunities

and joint projects. Field visits: Organizing field visits to factories and production sites to enhance students'

practical understanding. Continuous training: Providing continuous training programs for faculty members to update their knowledge and

Supporting scientific research: encouraging faculty members to conduct scientific research and publish it in production

engineering journals.

Modern Facilities: Updating and developing laboratory and practical facilities to provide a

modern educational environment. Academic Work: Providing academic and psychological work to students through specialized support cen

Opinion polls: Collect students' opinions on the course and teaching methods periodically to identify areas for

improvement. Active participation: Encourage students to actively participate in developing and improving the course..

Course Description

This description provides a brief overview of the main elements of the course and the academic outcomes that the ideal student is expected to achieve when taking advantage of the educational opportunities available. This description should be compared with the academic program description to determine compatibility and compliance between them.

1- Educational institution: University of Maysan

2- Scientific Department / Center: Department of Mechanical Engineering 3- Course Name / Code: Chemistry / Course Code: 4 ME114- Available forms of attendance: in-person or online 5- Semester / Year: First Semester / First Stage 6- Total number of vertical hours (75) hours 7- Date of preparation of this description: July 2024

8-**Course objectives:**

Understand the basic principles and concepts of chemistry, including atomic structure, chemical bonding, and chemical reactions. Apply chemical knowledge to analyze and predict the properties and behavior of materials used in mechanical engineering, such as metals and composites. Demonstrate an understanding of the relationship between chemical processes and mechanical engineering applications, such as corrosion, combustion, and heat transfer. Demonstrate an awareness of ethical and safety considerations in handling and working with chemicals.

9-**Course outcomes, teaching, learning and assessment methods**

A- Cognitive objectives

A1- Knowledge of atomic structure and chemical bonding: Understanding the structure of atoms, electronic configurations, chemical b

And hybrids, which form the basis for understanding the behavior of chemicals.

A2- Understanding radioactivity and nuclear chemistry: Explore the principles of radioactivity, nuclear stability, and radioactive decay.

Applications of nuclear chemistry in tracers, history, and energy sources.

A3- Knowledge of cement chemistry: Study of cement chemistry, including electrochemical corrosion, acidification reactions, The effect of weather on cement.

A4- Understanding thermochemistry and chemical kinetics: Learn about exothermic and endothermic reactions, heat of formation, Gas and water fuels, rocket propulsion, energy, and collisions. Study of the kinetics of chemical reactions and factors affecting reaction rates.

A5- Knowledge of Acids and Bases: Gain an understanding of acid-base chemistry, including water treatment, and constants. Separation, acid and base strength, pH scale, sterilization, clarification, boiler feed water. A6- Understanding Petroleum Refining: Explore the chemistry involved in petroleum refining, including point diagrams. Boiling, separation and treatment processes of hydrocarbons.

A7- Knowledge of hydrocarbons and aromatic compounds: Study of the structure of benzene, analogues of benzene, and the reactions Includes benzene substitution, as well as alcohol synthesis, ester formation, and phenol reactions.

A8- In general, these units aim to provide students with a comprehensive understanding of the main concepts and principles in Chemistry related to mechanical engineering. This knowledge will enable students to apply chemical principles to the analysis and solution of engineering problems, understand materials and their properties, and make informed decisions regarding chemical processes and reactions in mechanical engineering applications.

B- The course's specific skill objectives

B1- Apply chemical knowledge to solve engineering problems. B2- Use chemical methods to analyze and predict the behavior of materials. B3- Evaluate the environmental and health impacts of chemical processes. B4- Develop research and analysis skills in the field of engineering chemistry. B5- Effectively interact with multidisciplinary teams in engineering industries.

Teaching and learning methods

• Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills It is further developed by a set of problems prepared by the lecturers through small study groups and all work submitted is evaluated and responded to.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method using the (show data) device and relying on the (how and why) method for the topic

According to the curriculum of the

subject. **Evaluation methods**

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Develop effective communication skills with colleagues and clients in the field of engineering chemistry. D2- Deal with challenges and changes in the chemical industries in a professional manner. D3- Ability to self-learn and continuously develop in the field of engineering chemistry. D4- Ability to manage time and resources effectively in chemical processes.

D5-Interact constructively with the chemical engineering community and its participating engineers. **10. Course Structure**

Week 1 Atomic Structure and Bonding, Atomic Theory, the nuclear Atoms Week 2 Chemical Bonding, Hybridization, Electronic Structures

3 weeks Radioactivity, Periodic Tables, Material State

4 weeks Nuclear Stability, Radioactive Decay, Tracers, Dating, Power Sources

Week 5 of Cement, quiz Cement, Electrochemical Corrosion, Hydration Reaction, Weathering

Week 6 Endothermic Reaction Thermal Chemistry, Chemical Kinetics, Exothermic And

Week 7 heat of formation, fuel and water gas, rocket propulsions, Energy and collision

Week 8 Chemistry of acids and bases, Water Treatments, Dissociation Constants

Week 9 The Strength of Acid and Bases, The PH Scale, Known Acid and Base

10 weeks Sterilization, Clarification, Boiler feed Water, Boiling point .Diagram Petroleum Refining, Quiz

Week 11 .Benzene Structure, Substitution of Benzene

Week 12 Hydrocarbons, Aromatic Compounds

Week 13 synthesis of Alcohol, Alcohol Homologues of Benzene,

Week 14 substitution in benzene ring

Week 15 Preparatory week before the final exam Ester

Week 16 Formation, reaction of Phenol

10- Infrastructure:

1- Required textbooks

1. General Chemistry: Principles and Modern Applications" by Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura, and Carey Bissonnette.

Main References (Sources) -2 2. Principles of Modern Chemistry" by Oxtoby, Gillis, and Campion.

A- Recommended books and references (scientific journals, reports, etc., reliable websites).

Library sites in some international universities.

B - Electronic references, Internet sites

12. Curriculum Development Plan

Expanding the study of the chemical composition of materials used in mechanical engineering such as metals, alloys, composites and polymers. Or adding advanced topics such as the chemistry of nanomaterials, the chemistry of composite materials, and electrochemical reactions. Applying a blended learning system that combines traditional education and e-learning to enhance students’ understanding and interaction with the material.

Course Description

The course provides a comprehensive introduction to the use of tools and understanding the basics of engineering drawing, including explaining the types of drawing lines and how to use them, drawing engineering shapes and determining dimensions accurately. The course also helps in reading engineering drawings and extracting the necessary details and measurements to work through them using paper drawings.

1- Educational institution: University of Maysan

2- Scientific Department/Center: Department of Mechanical Engineering

3- Course name/code: Engineering Drawing/Course code: 4 ME115-

Available forms of attendance: in-person or online

5- Semester/Year First Semester/First Stage 6- Total number of vertical hours (175) hours 7- Date of preparation of this description July 2024 8-**Course objectives:**

The course aims to learn the rules and basics of engineering drawing. Knowing engineering drawing tools and how to use them.

Learn to read and write notes on engineering drawings. Learn how to create two-dimensional projections from three-dimensional drawings. Be able to read and write drawing measurements. Ability to draw three-dimensional shapes. Ability to draw engineering sections.

9-**Course outcomes, teaching, learning and assessment methods**

A- Cognitive objectives

A1- Understand the characteristics and functions of the different tools used in engineering drawing. A2- Learn how to use each tool correctly and accurately.

A3- Study the basic principles of engineering drawing.

A4- Learn the rules and standards that govern engineering drawing.

A5- Analyzing geometric shapes and understanding their different parts.

A6- Learn how to draw projections and intersecting pieces of geometric shapes.

B- The course's specific skill objectives

B1- Practice using different tools to draw geometric shapes accurately. B2-

Improve speed and efficiency in using tools.

B3- Aziz is able to imagine geometric shapes in their different dimensions. B4-

Apply projections and cross-sections to achieve geometric dimensions accurately.

Teaching and learning methods

• Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills It is further developed by a set of problems prepared by the lecturers through small study groups and all work submitted is evaluated and responded to.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Instilling a sense of interest in quality and details in engineering work.

A2- Enhancing the sense of responsibility towards producing accurate and detailed

engineering drawings. A3- Encouraging students to think creatively and critically in solving

engineering problems. A4- Enhancing the ability to think independently and deduce solutions.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in The Messenger is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Improving Internet search skills to access modern engineering information. D2- Learning how to use the Internet as a source of engineering information and ideas. D3- Improving communication skills between students and faculty members.

D4-Promote teamwork and cooperation among students in engineering projects. **10- Course structure**

1 week	Introduction to engineering drawing, drawing tools.
2 weeks	Types of lines, notes on line drawings, straight line operations. Circle
3 weeks	and arc operations.

4 weeks Polygon operations, ellipse operation. Test 1

5 weeks Transverse lines.

Week 6 Parallel projection, orthogonal projection

Week 7 Projection of the first and third angles, conclusion of the third presentation, notes on the projections.

Midterm exam

Week 8 Section lines, complete sections, section levels, half sections, zigzag sections,

Week 9 partial sections, unbroken parts, notes on sections

Short Test 2

10 weeks Dimension theory, Dimension elements, Dimensions, Dimension

Week 11 symbols. Driving dimensions, Dimensions of circles and angles

Week 12 Notes on the dimension.

Short Test 3

Week 13 Metric drawing.

Week 14 Oblique drawing.

Week 15 Perspective drawing.

Short Test 4

Week 16 Preparatory week before the final exam

11- **Infrastructure:**

1- Required textbooks

1. Systematic engineering drawing book, author Jaafar Al-Khafaf

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Review and update the vertical materials: Periodically check and update the vertical materials to include the latest developments in engineering drawing. Add advanced topics: Include topics such as 3D drawing, computer-aided drawing (CAD), and advanced engineering sections. Cooperate with engineering companies and institutions to provide training opportunities and applied projects for students. Field visits: Organize field visits to factories and laboratories to familiarize students with the practical environment and real-life applications of engineering drawing.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: English Language/Course Code: U116

4. Available forms of attendance: in-person or online

5. Chapter/Year First Semester/First Stage

6. Total number of vertical hours (100) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Developing Language Skills: The main aim of English language lessons is to help students develop their English speaking, listening, reading and writing skills. This includes improving vocabulary, grammar, pronunciation and comprehension skills.

Enhancing Communication Skills: English lessons aim to improve students' ability to communicate effectively in English. This includes developing fluency, strength and confidence in oral and written communication.

Build reading and comprehension skills. Develop writing skills.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Improving listening comprehension in various contexts such as lectures, conversations and recordings.

Audio.

A2- Read and understand a variety of texts, including literature, articles, and informational materials. **B- The course's specific skill objectives**

B1- To communicate effectively in English in both formal and informal situations. B2- To produce well-organized, coherent, and grammatically error-free written texts.

Teaching and learning methods

auditory activity Play lectures, conversations, or audio recordings and discuss the content with students. Graded practice: Starting from easy texts to more complex ones to ensure gradual progress.

Auditory tests: Use short auditory tests periodically to measure and improve comprehension. **Reading and understanding texts**:

Guided reading: presenting texts with questions that guide comprehension and analysis.

Class discussion: Organize discussion groups on the texts read to enhance mutual understanding. Text summarization: Train students to summarize the content of the texts read.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Take responsibility for your ongoing language learning and self-improvement. A2- Encourage the use of language learning applications and self-study programs.

A3- Help students set their own learning goals and track their personal progress. A4- Encourage students to reflect on their learning process and identify areas that need improvement.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1-

Developing different listening and comprehension skills.

D2- Effective oral communication, whether in formal or informal contexts. D3--

Reading and understanding of diverse texts.

D4-- Writing structured, coherent and grammatically correct texts.

D5-- Promote linguistic independence and take responsibility for continuous self-improvement. **10 Course structure**

1 week Reading and comprehension.

2 weeks Simple present and past tense

3 weeks	Simple past and past perfect
4 weeks	simple future
5 weeks	Touch accept touch pass and short test
Week 6	Just a camel
Week 7	Conditional statements (types 1, 2 and 3)
Week 8	Indirect questions
Week 9	Definite and Indefinite Articles
10 weeks	Idioms and a Short Quiz Present
Week 11	Perfect
Week 12	past perfect
Week 13	Passive voice.
Week 14	Complex and compound sentences
Week 15	Prepositions
Week 16	Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1- Headway plus, John and Liz Soars

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

This plan aims to improve students' understanding and use of English in different mechanical engineering contexts.

The plan will include the following:

Updating the main content: Providing up-to-date study materials related to mechanical engineering. Including topics related to technology and innovation in the engineering field.

Diversifying teaching and learning methods: Using modern educational techniques such as interactive activities and project-based learning. Integrating problem-based learning and engineering conversations in the curriculum.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: MathematicsCourse code: / E111

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (150) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Mathematics contributes to the core of engineering and serves as a source of knowledge that engineering students can benefit from. Therefore, engineering students must be able to apply mathematical knowledge and skills to solve engineering problems and design tasks. Having mathematical or engineering knowledge without understanding how to apply the strategies learned can limit a student's ability to provide the correct answer.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understanding the basic principles of mathematics.

A2- The ability to solve various mathematical problems. A3- Applying mathematical concepts in solving practical problems. **B- The course's specific skill objectives** B1- Developing mathematical problem-solving skills. B2- Using mathematical tools effectively. B3- Critical and analytical thinking in solving mathematical problems.

Teaching and learning methods

The main strategy that will be adopted in delivering this unit is to encourage students' participation in the exercises, while at the same time improving and extending their critical thinking skills. This will be achieved through interactive exercises and workshops and by considering the types of simple experiments that include some experimental and sampling activities that are interesting to students.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Dealing with challenges with a positive spirit and determination. D2- Self-learning and developing the ability to achieve personal goals. D3- Effective communication and working within multiple teams to solve sports problems. **10. Course Structure**

1 week Application of integration: The volume of solids (Disk and Washer)

2 weeks Application of integration: Area between curves and under curves methods)

3 weeks Application of integration: Areas of Surfaces of Revolution

4 weeks Application of integration: Lengths of curves in the plane

5 weeks Application of integration: The cylindrical shell method

Week 6 Techniques of integration: Integration by Parts, Trigonometric Trigonometric Substitutions .Integrals,

Week 7 Substitution and long division integrals

Week 8	Integrals of tan x and cot x. Integration of Rational
Week 9	Functions by Partial Fractions
10 weeks	Graphing in Polar Coordinates Polar Coordinate, Areas and
Week 11	Lengths in Polar Coordinates. Numerical Integration: The
Week 12	Simpson's Rule Numerical Integration: The Trapezoidal Rule
Week 13	Integration of Logarithmic Functions
Week 14	
Week 15	Matrices
Week 16	Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Thomas' Calculus, G B. Thomas, RLFinney, MD Weir, Addison - Wesley; 12th Edition, 2010

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Mechanical Engineering/Course Code: ME122

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (125) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The theoretical foundations of dynamics in mechanical engineering have been greatly expanded in recent years. The purpose of this course is to introduce students to this fundamental area of dynamics in mechanical engineering, with an initial focus on the kinematics of particles. The course covers concepts such as position, velocity, and acceleration, and includes the determination of the motion of single particles, the motion of multiple particles, and dependent motion. In addition, the course introduces Newton's second law in rectangular, tangent, and vertical components, as well as energy and momentum methods, the work-energy principle, potential energy, and the conservation of energy principle. Upon completion of the course, students are expected to be proficient in dynamics in mechanical engineering and to have the opportunity to explore current topics in the field.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understand how to calculate velocity and acceleration.

A2- Study the effect of the path on velocity and acceleration

calculations. A3- The effect of the straight and curved path on velocity and acceleration.

A4- Study of speed and acceleration in a circular

path A5- Relative motion

A6- The effect of forces on velocities and

accelerations **B- The course's specific skill objectives**

B1- Apply the concepts of velocity and acceleration to solve various problems. B2-

Analyze the effect of different paths on velocity and acceleration calculations. B3-

Explain the differences in velocity and acceleration between straight and curved paths.

B4- Using mathematics and physics to study circular motion and calculate velocity and acceleration in

it. B5- Analyzing the relative motion of objects in the case of a change in the motion frame.

B6- Evaluate the effect of different forces on velocities and accelerations in different scenarios.

Teaching and learning methods

Interactive lectures: Deliver lectures that encourage student interaction, incorporating practical and applied examples.

Group discussions: Organize discussions that help students gain a deeper understanding of concepts and exchange ideas and experiences.

Active learning: Encouraging students to participate in problem solving and actively interact with content, helping them

build deeper, more applied understanding.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall.

A2- The answer: Monitoring the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Critical

Thinking: Developing students' critical thinking abilities in analyzing motion, forces, accelerations, and understanding

Its effects.

D2- Self-learning: Enhancing students' skills in self-learning and the ability to absorb and understand mathematical concepts.

And physics independently.

D3- Effective Communication: Develop students' oral and written communication skills, including the ability to explain Technical ideas and calculations in a clear and accurate manner.

D4-Teamwork: Enhancing students' abilities to work within multiple teams and coordinate efforts to solve problems. Complex engineering.

D5-Creative thinking: Encouraging students to innovate and use engineering imagination to develop new solutions. For engineering challenges.

10. Course Structure

1 week	General Curvilinear Motion Rectilinear
2 weeks	Kinematics: Erratic Motion Rectilinear
3 weeks	Kinematics: Continuous Motion
4 weeks	Curvilinear Motion: Cylindrical Components Curvilinear
5 weeks	Motion: Normal & Tangential Components Curvilinear
Week 6	Motion: Motion of a Projectile.
Week 7	Absolute Dependent Motion: Analysis of two particles
Week 8	Equation of Motion: Rectangular Coordinates Relative Motion:
Week 9	Analysis of two particles using Translating axes
10 weeks	Equation of Motion: Cylindrical Coordinates Equation of
Week 11	Motion: Normal and Tangential Coordinates
Week 12	Work and Energy
Week 13	Principles of Linear Impulse and Momentum
Week 14	Conservative Forces and Potential Energy

Week 16 Principle of Linear Impulse and Momentum for a System of

Particles15 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Higdon.
2. Meriam

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Develop a comprehensive curriculum that covers dynamics concepts from the beginning to a deep understanding of physical laws. Include interactive and applied activities such as practical experiments, projects, and discussion groups to promote active learning and practical application. Use a variety of teaching methods such as interactive lectures, educational videos, and computer simulations to clarify difficult concepts.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering Workshops/Course Code: ME123

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Students will be able to work on different pieces of equipment and machinery in different workshops such as milling, grinding and milling. Students will also be able to manufacture products using some manufacturing processes such as casting and forging, and join metal materials using welding, brazing and soldering processes.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Identify some of the reasons that make manufacturing using machines commercially and technically important. A2- Mention the three most common manufacturing processes.

A3- Cite the two basic categories of cutting tools in manufacturing operations. A4- List the different operations that can be performed on a central lathe. A5- Describe some methods of forming twins on a central lathe.

A6- Describe different types of drilling machines. A7- Describe the horizontal milling machine.

A8- Explain the difference between end milling and face milling.

A9- Describe the cylindrical grinding process, and give an idea of the grinding wheel speeds and recommended operating speeds

With it for this process.

A10- Description of surface grinding operations using disc wheel and squeegee wheel.

A11- Citation of necessary properties in good casting sand.

A12- Description of the procedure for making a two-piece split-pattern mold.

A13- List some common casting defects and explain the reasons that cause these defects.

A14- Explain the difference between open and closed hammer forming techniques.

B- The course's specific skill objectives

B1- Describe different manufacturing processes accurately and comprehensively. B2- Differentiate between different types of machines and cutting tools. B3- Apply shaping and grinding techniques effectively. B4- Use manufacturing tools accurately and effectively.

B5- Distinguish between different welding processes and use them successfully.

Teaching and learning methods

Interactive lectures: Present theoretical content while encouraging interaction with students by asking questions and encouraging discussions.

Group Discussions: Organize discussions on advanced topics in manufacturing and welding to promote critical thinking and exchange of ideas among students.

Critical Assessment: Provide opportunities for students to critically evaluate and improve manufacturing and welding processes.

Presentations: Students were asked to prepare presentations on manufacturing and welding processes and present them to the class to increase interaction and participation.

Individual Tutoring: Provide individual assistance to students to enhance their understanding of difficult concepts in fabrication and welding

Use of modern technologies: Use of multimedia educational media such as educational videos and interactive programs to explain various manufacturing processes.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Critical Thinking: Developing students' critical thinking abilities in analyzing motion, forces, accelerations, and understanding Its effects.

D2- Self-learning: Enhancing students' skills in self-learning and the ability to absorb and understand mathematical concepts. And physics independently.

D3- Effective Communication: Develop students' oral and written communication skills, including the ability to explain Technical ideas and calculations in a clear and accurate manner.

D4-Teamwork: Enhancing students' abilities to work within multiple teams and coordinate efforts to solve problems. Complex engineering.

D5-Creative thinking: Encouraging students to innovate and use engineering imagination to develop new solutions. For engineering challenges.

10. Course Structure

1 week Carpentry: carpentry tools, cutting tools, flat tools

2 weeks Drills, miter saws, electric planes, circular saws, router cutters, Orbital sander

3 weeks Installation: Installation tools, striking tools, cutting tools

4 weeks Measurement, Marketing and Testing Tools, Impact Driver, Chainsaw, Angle Grinder

5 weeks	Drill, nail gun, impact wrench, cutting tool
Week 6	Welding: Arc Welding Equipment Gas
Week 7	Welding: Oxy-Stylene Welding Equipment
Week 8	Tin welding equipment, copper welding equipment
Week 9	Lathe: Lathe machine (lathe)
10 weeks	Cutting machine
Week 11	The hole machine
Week 12	Milling machine
Week 13	S.B.A.K.A.: Oven
Week 14	Sand casting, casting box
Week 15	formability
Week 16	Preparatory week before the final exam

11- **Infrastructure:**

1- Required textbooks

1. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, Mikell P. Groover.

2. Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Mechanical Engineering/Course Code: ME122

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (125) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The theoretical foundations of dynamics in mechanical engineering have been greatly expanded in recent years. The purpose of this course is to introduce students to this fundamental area of dynamics in mechanical engineering, with an initial focus on the kinematics of particles. The course covers concepts such as position, velocity, and acceleration, and includes the determination of the motion of single particles, the motion of multiple particles, and dependent motion. In addition, the course introduces Newton's second law in rectangular, tangent, and vertical components, as well as energy and momentum methods, the work-energy principle, potential energy, and the conservation of energy principle. Upon completion of the course, students are expected to be proficient in dynamics in mechanical engineering and to have the opportunity to explore current topics in the field.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understand how to calculate velocity and acceleration.

A2- Study the effect of the path on velocity and acceleration calculations. A3- The effect of the straight and curved path on velocity and acceleration.

A4- Study of speed and acceleration in a circular

path A5- Relative motion

A6- The effect of forces on velocities and

accelerations **B- The course's specific skill objectives**

B1- Apply the concepts of velocity and acceleration to solve various problems. B2-

Analyze the effect of different paths on velocity and acceleration calculations. B3-

Explain the differences in velocity and acceleration between straight and curved paths.

B4- Using mathematics and physics to study circular motion and calculate velocity and acceleration in it.

B5- Analyzing the relative motion of objects in the case of a change in the motion frame.

B6- Evaluate the effect of different forces on velocities and accelerations in different scenarios.

Teaching and learning methods

Interactive lectures: Deliver lectures that encourage student interaction, incorporating practical and applied examples.

Group discussions: Organize discussions that help students gain a deeper understanding of concepts and exchange ideas and experiences.

Active learning: Encouraging students to participate in problem solving and actively interact with content, helping them

build deeper, more applied understanding.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall.

A2- The answer: Monitor the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Critical Thinking: Developing students' critical thinking abilities in analyzing motion, forces, accelerations, and understanding Its effects.

D2- Self-learning: Enhancing students' skills in self-learning and the ability to absorb and understand mathematical concepts. And physics independently.

D3- Effective Communication: Develop students' oral and written communication skills, including the ability to explain Technical ideas and calculations in a clear and accurate manner.

D4-Teamwork: Enhancing students' abilities to work within multiple teams and coordinate efforts to solve problems. Complex engineering.

D5-Creative thinking: Encouraging students to innovate and use engineering imagination to develop new solutions. For engineering challenges.

10. Course Structure

1 week	General Curvilinear Motion Rectilinear
2 weeks	Kinematics: Erratic Motion Rectilinear
3 weeks	Kinematics: Continuous Motion
4 weeks	Curvilinear Motion: Cylindrical Components Curvilinear
5 weeks	Motion: Normal & Tangential Components Curvilinear
Week 6	Motion: Motion of a Projectile.
Week 7	Absolute Dependent Motion: Analysis of two particles
Week 8	Equation of Motion: Rectangular Coordinates Relative Motion:
Week 9	Analysis of two particles using Translating axes
10 weeks	Equation of Motion: Cylindrical Coordinates Equation of
Week 11	Motion: Normal and Tangential Coordinates
Week 12	Work and Energy
Week 13	Principles of Linear Impulse and Momentum
Week 14	Conservative Forces and Potential Energy

Week 16 Principle of Linear Impulse and Momentum for a System of Particles15 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Higdon.
2. Meriam

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Develop a comprehensive curriculum that covers the concepts of dynamics from the beginning to a deep understanding of the laws of phys

Include interactive and hands-on activities such as hands-on experiments, projects, and discussion groups to promote active learning and practical application. Use a variety of teaching methods such as interactive lectures, educational videos, and computer simulations to clarify difficult concepts..

Course Description

The course provides a comprehensive overview of the various branches of physics such as mechanics, thermodynamics, electricity and magnetism, quantum mechanics, and relativity. It is worth mentioning that some basic laws such as Newton's laws of motion and the law of conservation of energy will be covered comprehensively.

1. **Educational Institution: University of Maysan**
2. **Scientific Department/Center: Department of Mechanical Engineering**
3. **Course name/code: Physics/Course code: E127**
4. **Available forms of attendance: in-person or online**
5. **Chapter/Year Second Semester/First Stage**
6. **Total number of vertical hours (75) hours.**
7. **Date of preparation of this description: July 2024**

8.**Course objectives:**

This course aims to provide an understanding of the behavior of fluids at rest, including topics such as fluid pressure, pressure measurement, surface tension, Bernoulli's equation, viscosity, and the effects of turbulence. Students will learn how to apply these concepts in practical engineering applications. To provide students with a comprehensive overview of the properties of solids, including crystal structures, stress and strain analysis, elasticity and plasticity, and the behavior of materials under various loading conditions. Students will learn about concepts such as the modulus of elasticity, Poisson's ratio, and energy stored in stressed bodies. To acquire knowledge and skills in measuring and analyzing physical quantities, including the use of appropriate equipment and units. To introduce students to techniques for measuring temperatures and the thermal properties of materials. Topics measured may include different types of thermometers, thermal expansion of materials, thermal resistance, and phase transitions in materials due to temperature changes. Emphasis is placed on the study of motion, including equations of motion, simple harmonic motion (such as a pendulum), damped motion, forced motion, and wave motion. Students will le

Sound, including its power and intensity, the relationship between sound and temperature, and the Doppler effect.

Students will learn about the properties and behavior of sound waves in different media.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1-Understand the principles of fluid pressure and methods of measuring it.

A2-Apply Bernoulli's equation to analyze fluid flow under various

A3-conditions. Explain the concept of surface tension and its practical applications.

A4-Understand the behavior of fluids under turbulent conditions.

A5-Analyze and solve problems related to viscosity and flow of

A6-fluids. Describe different types of crystalline materials and their structure.

A7-Analysis of stress and strain in materials and understanding their behavior under

A8-different loading conditions. Calculation of modulus of elasticity and Poisson's ratio of materials.

A9-Evaluate the energy stored in stressed bodies and understand their elastic and plastic behavior.

A10- Explain the principles of operation of different types of

thermometers. A11- Understand the concept of thermal expansion and methods of measuring it.

A12- Analyze phase transitions in materials due to temperature changes. A13-

Evaluate thermal properties of materials and their effects in engineering

applications. A14- Apply equations of motion to analyze and solve problems

related to motion. A15- Understand the behavior of simple harmonic motion, such as a pendulum.

A16- Analysis of damped and forced motion and their practical effects.

A17- Understand the nature of wave motion and analyze longitudinal waves

in pipes. A18- Understand the power and intensity of sound waves.

A19- Analyze the relationship between sound and

temperature. A20- Explain the Doppler effect and its applications.

A21- Analyze and solve problems related to the behavior of sound waves in various media.

B- The course's specific skill objectives

B1- Ability to analyze mechanical effects on materials including stress and strain. B2- Ability to explain the behavior of materials under different loading conditions.

B3- The ability to calculate the modulus of elasticity and Poisson's ratio using the given data and appropriate equations. B4- The ability to explain the importance of these properties in the behavior of materials and their engineering applications.

B5- The ability to use equations of motion to understand and analyze the motion of objects under different conditions. B6- The ability to apply mechanical theories to solve practical problems related to motion.

B7- The ability to interpret the properties of sound waves, including their power, intensity, and the effect of temperature on them.

Teaching and learning methods

Active and interactive learning: Encourage students to participate in live discussions on key concepts such as fluid pressure and Bernoulli's equation. Use active learning techniques such as group discussions and project-based learning to enhance students' understanding and application of concepts to practical situations.

Problem-based learning: Presenting realistic problems related to fluids and properties of materials to encourage students to use the concepts they have learned to solve them. Encouraging students to think critically and use available information to derive appropriate solutions.

Use of interactive techniques: Use of multimedia such as illustrations and digital simulations to illustrate phenomena such as surface tension and its effects. Provide interactive online tools to facilitate understanding of complex concepts such as motion analysis and sound waves.

Collaborative learning: Encourage students to work in small groups to solve problems involving materials and liquids. Promote communication and teamwork skills by discussing ideas and sharing different experiences among students. **Evaluation methods**

• Interaction within the lecture.

- Homework and reports.

- Short tests (quizzes)

- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interactio

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the present

And defends it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in

The Messenger is neither lazy nor restless.

Teaching and learning methods

- The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

- The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

- Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

- Surprise exams during the theoretical lecture.

- Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Apply the equation of motion to analyze and solve problems related to motion. D2- Understand the behavior of simple harmonic motion, such as a pendulum.

D3- Analysis of damped and forced motion and their practical effects.

D4- Understanding the nature of wave motion and analyzing longitudinal waves in pipes.

D5- Analyze and solve problems related to the behavior of sound waves in various media. **10. Course Structure**

1 week	Static fluids
2 weeks	Pressure measuring devices, surface tension,
3 weeks	capillary effect, applications of Bernoulli's equation
4 weeks	to viscosity, Poisson's law, turbulence and Reynolds number
5 weeks	Properties of solids, crystalline materials, short test
Week 6	Crystal structure, stress, ductility,
Week 7	elasticity, modulus of elasticity
Week 8	Poisson's ratio, energy stored in a body in tension,
Week 9	temperature measurement
10 weeks	Phase transformation, thermal properties of materials,
Week 11	short-wave test
Week 12	damped motion, forced motion
Week 13	Wave motion, longitudinal wave in pipes

Week 14 Sound waves

Week 15 Doppler effect

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. PHYSICS FOR SCIENTISTS AND ENGINEERS, Sixth Edition

2. Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Use multiple learning methods such as videos, graphics, and interactive simulations. Integrate e-learning and distance learning sessions. Include issues and challenges that require critical thinking and analysis. Encourage students to provide their own interpretations and innovative solutions.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Mechanical Engineering/Course Code: ME122

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (125) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The theoretical foundations of dynamics in mechanical engineering have been greatly expanded in recent years. The purpose of this course is to introduce students to this fundamental area of dynamics in mechanical engineering, with an initial focus on the kinematics of particles. The course covers concepts such as position, velocity, and acceleration, and includes the determination of the motion of single particles, the motion of multiple particles, and dependent motion. In addition, the course introduces Newton's second law in rectangular, tangent, and vertical components, as well as energy and momentum methods, the work-energy principle, potential energy, and the conservation of energy principle. Upon completion of the course, students are expected to be proficient in dynamics in mechanical engineering and to have the opportunity to explore current topics in the field.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understand how to calculate velocity and acceleration.

A2- Study the effect of the path on velocity and acceleration

calculations. A3- The effect of the straight and curved path on velocity and acceleration.

A4- Study of speed and acceleration in a circular path A5- Relative motion

A6- The effect of forces on velocities and accelerations **B- The course's specific skill objectives** B1- Apply the concepts of velocity and acceleration in solving various problems. B2- Analyze the effect of different paths on velocity and acceleration calculations. B3- Interpret the differences in velocity and acceleration between straight and curved paths.

B4- Using mathematics and physics to study circular motion and calculate velocity and acceleration in it. B5- Analyzing the relative motion of objects in the case of a change in the motion frame.

B6- Evaluate the effect of different forces on velocities and accelerations in different scenarios.

Teaching and learning methods

Interactive lectures: Deliver lectures that encourage student interaction, incorporating practical and applied examples.

Group discussions: Organize discussions that help students gain a deeper understanding of concepts and exchange ideas and experiences.

Active learning: Encouraging students to participate in problem solving and actively interact with content, helping them build deeper, more applied understanding.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall.

A2- The answer: Monitor the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the m

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Critical

Thinking: Developing students' critical thinking abilities in analyzing motion, forces, accelerations, and understanding

Its effects.

D2- Self-learning: Enhancing students' skills in self-learning and the ability to absorb and understand mathematical concepts.

And physics independently.

D3- Effective Communication: Develop students' oral and written communication skills, including the ability to explain Technical ideas and calculations in a clear and accurate manner.

D4-Teamwork: Enhancing students' abilities to work within multiple teams and coordinate efforts to solve problems. Complex engineering.

D5-Creative thinking: Encouraging students to innovate and use engineering imagination to develop new solutions. For engineering challenges.

10. Course Structure

1 week	General Curvilinear Motion Rectilinear
2 weeks	Kinematics: Erratic Motion Rectilinear
3 weeks	Kinematics: Continuous Motion
4 weeks	Curvilinear Motion: Cylindrical Components Curvilinear
5 weeks	Motion: Normal & Tangential Components Curvilinear
Week 6	Motion: Motion of a Projectile.
Week 7	Absolute Dependent Motion: Analysis of two particles
Week 8	Equation of Motion: Rectangular Coordinates Relative Motion:
Week 9	Analysis of two particles using Translating axes
10 weeks	Equation of Motion: Cylindrical Coordinates Equation of
Week 11	Motion: Normal and Tangential Coordinates
Week 12	Work and Energy
Week 13	Principles of Linear Impulse and Momentum
Week 14	Conservative Forces and Potential Energy

Week 16 Principle of Linear Impulse and Momentum for a System of Particles15 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Higdon.
2. Meriam

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Develop a comprehensive curriculum that covers dynamics concepts from the beginning to a deep understanding of physical laws. Include interactive and applied activities such as practical experiments, projects, and discussion groups to promote active learning and practical application. Use a variety of teaching methods such as interactive lectures, educational videos, and computer simulations to clarify difficult concepts.

Course Description

The model description provides a concise description of the main features of the course and the expected learning

outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Electrical Engineering/Course Code: ME125

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (175) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Understand and know DC circuits. Identify DC electrical circuit symbols. Develop student's skills in using analysis methods and network theories. Develop abstract, logical and critical thinking and the ability to think critically about their work and the work of others.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Identify the basic symbols and terms in electrical engineering. A2-

Learn the basics of direct current (DC) electrical circuits.

A3- Knowing how to use analysis methods. A4-

Knowing the theories of electrical networks.

A5-- Learn to solve electrical circuits using analysis methods and network theories. **B-**

The course's specific skill objectives B1-

Learn to solve problems related to electrical circuits.

B2- Learn how to use advanced scientific computers.

B3- Learn how to use short-term solutions in electrical engineering.

B4- Learn how to find solutions to engineering problems using analysis methods.

Teaching and learning methods

Raising the scientific and cognitive levels of students by employing automated technology, the dialogical approach, and the active method.

- The dialogical method

- Active method (depends on the student's activity)

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Problem Solving: The ability to analyze technical problems and find innovative and appropriate solutions for them.

D2-Critical and Analytical Thinking: The ability to think logically and critically to analyze data and problems and make decisions. Effective decisions.

D3- Project Management: Skills in planning, organizing and managing engineering projects to ensure their completion on time. Within the specified budget.

D4- Effective communication: The ability to clearly express technical ideas and results, either orally or in writing. And cooperation with technical and non-technical teams.

D5-Teamwork: Working effectively within a team to achieve common goals and solve complex challenges. D6-Time management: The ability to organize time and set priorities to achieve goals and tasks within a time frame. specific.

10. Course structure

1 week	Introduction to Current Circuits: Electrical Quantities: Charge: Electric Force
2 weeks	Conductors and insulators, current, potential electricity and voltage, energy
3 weeks	and power, basics of electrical circuits, resistance and resistivity
4 weeks	Conductivity and conductance, effect of temperature on resistance, sources (voltage and current sources)
5 weeks	Ohm's law, Kirchhoff's law
Week 6	Principles of electrical engineering, series and parallel
Week 7	connection, voltage division rule, current division rule
Week 8	Analysis method, branch stream
Week 9	method, network analysis
10 weeks	Star-Delta, Delta-Star Transform,
Week 11	Network Theory, Superposition
Week 12	Theory, Source Transform
Week 13	Thevenin's Theorem
Week 14	Norton's theory
Week 15	Maximum power transfer theory.
Week 16	Preparatory week before the final exam

Weekly Lab Syllabus:

Week 1	Introduction: Lab 1
2 weeks	Kirchhoff's Laws of Voltage and Current Experiment: Lab 2

3 weeks Ohm's Law: Lab 3

4 weeks Lab Open and Close Circuit 5:

5 weeks Lab 4:Overlay

Week 6 Norton's Theorem and Kirchhoff's Laws: Lab

Week 7 6 Thevenin's Theorem and Kirchhoff's Laws:

11- Lab 7 **Infrastructure:**

1- Required textbooks

1. Introductory Circuit Analysis, Boylestad

2. Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Use multiple learning methods such as videos, graphics, and interactive simulations. Integrate e-learning and distance learning sessions. Include issues and challenges that require critical thinking and analysis. Encourage students to provide their own explanations and innovative solutions**.**

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course name/code: Principles of Computer Science and Programming/Course code: U126

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (150) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course introduces students to the principles of programming using C++ by learning about C++ features, parts of a C++ program, C++ contents, symbols, reserved words, identifiers, library functions, constants, arithmetic operators, logical tools, priority of arithmetic and logical operations, and other expressions in C++, in addition to exercises and solved problems. Students will also understand the concept of data types, variables, assignments, input and output instructions, conditional statements and iteration cycles, arrays, and functions. This course allows students to have a basic background in computer programming that enables them to use it to solve problems they face in their specializations. Create programs using the C++ programming language.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Introducing the student to the principles of programming language using C++. A2- Understanding the use of input and output instructions in programming. A3- Knowing how to deal with arrays.

A4- Identify the types of matrices.

A5- Knowing how to read and print matrices.

A6- Identify arithmetic operations on matrices.

A7- Explain the benefits of using parent, main machine, and returning values.

A8-Identifying where to write the parent in the program, calling the machine, operators and signs, definition

With examples..

B- The course's specific skill objectives

B1- Students' ability to use and deal with conditional statements and repetition cycles such as:

- The if statement.
- else-if statement.
- The vehicle if.
- switch-case statement.
- Triple conditional operator.

B2- Developing students' programming skills by using repetition statements while writing programs.

like:

- The phrase For.
- Do-While statement.
- The While statement.
- Nested repetitive expressions.

B3- Learn how to use break and continue commands in program code. Create

B4- programs using arrays in the C++ programming language.

B5- Create programs using the C++ programming language.

Teaching and learning methods

The main strategies that will be adopted in implementing this unit are:

1- Encouraging students to participate in exercises. This is achieved through vertical classes and programmers.

Interactive Education

2- Improving and expanding critical thinking skills at the same time and thinking about the type of simple experiences that

Some sampling activities that may interest students include:

3- Raising the scientific and cognitive levels of students through the use of automatic technology and the conversational approach.

And the active way.

4- Problem solving.

5- Independent study

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Problem Solving: The ability to analyze technical problems and find innovative and appropriate solutions for them. D2-Critical and Analytical Thinking: The ability to think logically and critically to analyze data and problems and make decisions.

Effective decisions.

D3- Project Management: Skills in planning, organizing and managing engineering projects to ensure their completion on time.

Within the specified budget.

D4- Effective communication: The ability to clearly express technical ideas and results, either orally or in writing.

And cooperation with technical and non-technical teams.

D5-Teamwork: Working effectively within a team to achieve common goals and solve complex challenges.

D6- Time management: The ability to organize time and set priorities to achieve goals and tasks within a time frame.

specific.

10. Course structure

1 week Chapter 1: Introduction to the C++ Programming Environment

2 weeks Symbols, reserved words, identifiers, library functions, constants, arithmetic operators,

Logical tools, priority of arithmetic and logical operations, other expressions in C++, exercises and solved problems.

3 weeks Chapter Two: Input and Output Instructions

4 weeks Character routing. Coordinated input/output control unit

5 weeks Chapter Three: Conditional Statements and Repetition Statements

Week 6 Switch statement, ternary conditional operator

Week 7 Loop phrases: a) To state. b) Do-while-doing statement. c) During statement.

Midterm Exam

Week 8 Loop Statements: d) Nested loop statements. e) Break and continue commands. f) Notes on

loop statements

Week 9 Chapter Three: Review, Exercises and Discussion

10 weeks Chapter 4: Arrays, Introduction, Types of Arrays: One-dimensional arrays. Two-dimensional arrays.

Distance. Short test.

Week 11 Chapter 4: Matrices, reading and printing matrices. Arithmetic operations on

matrices. Notes on matrices.

Week 12 Chapter 4: Matrices, solved questions.

Week 13 Chapter 5: Functions, Introduction, Benefits of using functions, Main function, Returning values, Where function written in the program, Report due.

Week 14 Chapter Five: Functions, Communication Function, Factors, Media, and Job Announcement

Week 15 Chapter Five: Functions, Examples, Review

Week 16 Preparatory week before the final exam

Weekly Lab Syllabus:

Week 1 Input and Output Instructions: Lab 2, C++ Contents, C++ Program Parts, C++ Limits,

Week 2 C++ Introduction to: Lab 1

Week 3 .if) Conditional statements: a: Lab 3 b) else-if

Week 4 Conditional statements: c) Compound if: Lab 4 d) Switch status statement.

Week 5 b) do-while loop statements: Lab Conditional statements: e)

Week 5 Ternary conditional operator. 6: Lab 5 :a) for statement .

.statement

Week 7 d)Nested Lab 7: Loop Statements: c) while statement .

.loop statements

Week 7 ,Lab 12: Main function, returning values

Week 9 .Lab 11: Review and Solved Questions .Lab

10 weeks 10: Two-dimensional arrays programs .Lab 9:

11th week One-Dimensional arrays programs .Lab 8:

12 weeks break & continue orders

13 weeks Lab 14: Examples Lab 13: Calling function, factors & media,

14 weeks declaration of functions

15 weeks Lab 15: Final examination

11- Infrastructure:

1- Required textbooks

computing, Southern Adventist University, 2018 1. Fundamentals of C++ Programming, Richard L. Halterman, School of

2. Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Use multiple learning methods such as videos, graphics, and interactive simulations. Integrate e-learning and distance learning sessions. Include issues and challenges that require critical thinking and analysis. Encourage students to provide their own explanations and innovative solutions..

Course Description

Definition of human rights, the democratic system and intellectual positions on them, with an explanation of the different models and their

Civil society in it

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course name/code: Democracy and Human Rights/Course code: U121

4. Available forms of attendance: in-person or online

5. Chapter/Year Second Semester/First Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The overall objectives of the Human Rights and Democracy course are to give students a solid foundation in the fundamentals of human rights and democracy, problem-solving skills, practical knowledge, and a mindset for further learning and use of human rights and democracy in diverse societal settings.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Cognitive objectives

A2- A-1 Historical introduction to democracy.

A3- A-2 Different models of democracy. A4-

A-3 Rights and responsibilities

A5- A4 Civil Liberties

B- The course’s specific skill objectives

B1- Applying quantitative methods to explain and interpret the idea of rights and democracy.

B2- Use basic knowledge to research the historical development of the concept of

freedom. B3- Evaluate the information needed to understand different opinions on a common topic.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-

solving skills are further developed through a set of problems prepared by lecturers in small study groups and

all work presented is evaluated and responded to.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to complete assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. **10.**

Course structure

1 week The foundation of freedom

2 weeks intellectual and cultural freedom

3 weeks Political freedom, economic and social freedom

4 weeks Political freedom, economic and social freedom

5 weeks Public freedoms are not accepted

Week 6	Universal Declaration of Human Rights and
Week 7	Freedoms Universal Declaration of Human
Week 8	Rights and Freedoms Freedom in Peace
Week 9	A brief explanation of the types
10 weeks	of democracy and an
Week 11	introduction to it. Applications of democracy
Week 12	Administrative and financial corruption
Week 13	Administrative and financial corruption
Week 14	Democracy in Peace
Week 15	Preparing for the final exam
Week 16	Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Human Rights and Democracy.

2. Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering MathematicsCourse code: / **E211**

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to teach the student the methods of mathematics and to know how to perform calculations.

Develop students' understanding of mathematical methods useful in engineering calculations. Study and solve applications using mathematics.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- The student acquires knowledge of useful mathematical methods that enable him to deal with problems and applications. And calculations in various branches of science in mechanical engineering.

A2- Understand the basic mathematical theories and their applications in mechanical engineering. A3- Know how to use mathematical methods to solve engineering problems.

A4- Gaining the ability to apply mathematical calculations in fields such as thermodynamics, mechanics, Fluids, and analysis of jihad.

B- The course's specific skill objectives

B1- Develop the ability to solve complex problems using appropriate mathematical methods. B2- Enhance analytical skills and critical thinking in applying mathematics to mechanical engineering problems.

B3- Gaining proficiency in using technological tools and software to perform mathematical calculations.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by lecturers in small study groups and all work presented is evaluated and responded to.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to complete assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

10. Course structure

1 week Chapter 1: Matrices, properties of matrices, types of matrices

2 weeks Chapter 1: Matrices, Operations on Matrices, Determinants, Homework Chapter

3 weeks 1: Matrices, Inverse of a Matrix (Inverse of a Matrix), Quiz Chapter 1: Matrices,

4 weeks Solving Simultaneous Linear Equations, Assignment

5 weeks Chapter 2: Vector Calculation, Quantities and Vectors, Vector Component, Calculation Rules

Vectors, short test.

Week 6 Chapter 2: Vector Calculation, Vector Rule, Perpendicular Vectors

Week 7 Chapter 2: Vector Calculation, Dot Product, Cross Product, Multiplication of Three Vectors

Or more

Week 8 Chapter Two: Calculus, Equations of Lines in Space, Levels in

Area 3, Midterm Exam

Week 9 Chapter 3: Vector Lines, Limits and Continuity, Derivatives, Forms of Curve Equations in Space,

Parametric Representation, Tangent and Normal Unit Vectors, Homework

Week 10 Chapter 3: Vectors, curvature, radius of curvature, motion along a curve, speed, acceleration and

velocity, normal and tangential components of acceleration, short test.

Week 11 Chapter 4: Multiple Integrals, Double Integrals, Areas and Volumes

Week 12 Chapter 4: Multiple Integrals, Double Integral in Polar Coordinates, Assignment

Week 13 Chapter 4: Multiple Integrals, Parametric Surface, Surface Area, Integrals

Superficiality

Week 14 Chapter 4: Multiple Integrals, Surface Integrals, Volume Evaluation and Triple Integration

Week 15 Chapter 4: Multiple Integrals, Volume Evaluation and Triple

Week 16 Integration Weekly Preparation Before Final Exam

11- Infrastructure:

1- Required textbooks

1. George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano - Thomas's calculus.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering mathematics. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Static Fluid Mechanics/Course Code: ME212

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The overall objectives of the Fluid Mechanics course are to provide students with a solid foundation in the fundamentals of fluid mechanics, develop problem-solving skills, impart practical knowledge, and develop the mindset for further learning and use of fluid mechanics in a variety of engineering situations.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understanding the concepts and definitions of unit systems, fluids and their physical properties. A2- Studying the types of fluids and working with the principle of continuity in fluids.

A3- Understanding the concept of pressure and the differences between relative and absolute pressure. A4- Studying the effect of pressure with changes in altitude.

B- The course's specific skill objectives

B1- Develop the ability to solve complex problems using appropriate mathematical methods. B2- Apply physical laws and principles to solve problems related to fluids.

B3- Calculating the forces acting on submerged bodies and dividing them into their horizontal and vertical components. B4- Using the concept of buoyancy force and applying it to calculating the stability of floating bodies.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by the lecturers in small study groups and assessment and response to all work presented. The course objectives will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful images, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to complete assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

Course structure 10.

1 week	Introduction, definition of unit systems,
2 weeks	definition of fluids and their physical properties

3 weeks Types of fluids, law of continuity

4 weeks Pressure and its applications, definition of relative pressure and absolute pressure, change in

5 weeks pressure with height, definition of absolute pressure and relative pressure

Week 6 Pressure changes with

Week 7 altitude midterm exam

Week 8 Forces on submerged bodies

Week 9 Calculate the force acting on a flat submerged surface and its vertical and horizontal components on a curved body.

immersed

10 weeks Floating bodies and their instability

Week 11 Definition of buoyancy force and its applications to floating

Week 12 bodies Determining the stability of floating bodies using metacenter

Week 13 Accelerated fluids: The effect of fluid motion at constant acceleration on pressure distribution is studied, with

Study of both linear and angular acceleration.

Week 14 Dimensional Analysis: The most important unweighted dimensional

Week 15 numbers are defined. Methods for combining multiple variables in a

Week 16 single dimensional relationship are presented. The preparatory week before the final exam.

11- Infrastructure:

1- Required textbooks

2.Fuel Mechanics. Frank M.

WHITE 1. Fuel Mechanics. C. Hibbeler

3. Fundamental of fluid mechanics. munson, okllohi

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of fluids. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: ThermodynamicsCourse code: / ME213

4. Available forms of attendance: in-person or online

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

To provide students with the ability to integrate classical thermodynamics and fluid mechanics principles to build a foundation for the subsequent analysis of industrial plant equipment and processes. To ensure that all students are able to approach thermal systems analytically in a logical and systematic manner. To understand the fundamentals, concepts and terminology associated with heat. To understand the laws of heat and appreciate their consequences. To develop some b

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Introducing the basics, concepts and definitions of the properties of heat. A2- Explaining the independent and dependent properties, intensive and extensive. A3- Identifying the first law of heat in the concept of NFEE and SFEE. A4- Define steam, system and two-phase process using steam.

A5- Knowing the second law of heat.

B- The course's specific skill objectives

B1- Understand the state diagram, path equation, thermal equilibrium, and thermal process. B2- Identify reversible and irreversible processes.

B3- Define the concept of heat.

B4- Identify real gases and ideal gases. B5- Explain the differences between Boyle's, Charles', and Gay-Lussac's laws.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by the lecturers in small study groups and assessment and response to all work presented. The course objectives will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful images, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the present

And defends it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in

The Messenger is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

10. Course structure

1 week	Chapter 1: Basics of Thermodynamics, Definition of Terms Chapter 1: Basics of
2 weeks	Thermodynamics, Heat, Work, and System Chapter 1: Basics of Thermodynamics,
3 weeks	Inverse and Inverse Work Chapter 1: Basics of Thermodynamics, Zeroth Law of
4 weeks	Thermodynamics Chapter 2: Energy and the First Law of Thermodynamics, Non-Flow
5 weeks	Energy Equation Chapter 2: Energy and the First Law of Thermodynamics, Steady Flow
Week 6	Energy Equation Chapter 3: Ideal Gas and Specific Heat, Ideal Gas Equation, Relationship
Week 7	between Heat

Quality. Boyle's, Charles' and Gay-Lussac's laws.

Week 8 Chapter 3: Ideal Gas and Specific Heat, Process using an ideal gas. Closed and open systems - reversible.

Week 9	Chapter 3: Ideal Gas and Specific Heat, Applications of Ideal Gas Systems Chapter 4: Steam
10 weeks	and the Two-Phase System, Properties of Steam and Liquid. Steam Table. Chapter 4: Steam
Week 11	and the Two-Phase System, Processes Using Steam
Week 12	Chapter 4: Steam and the Two-Phase System, Open System - Irreversible Process Chapter 5:
Week 13	The Second Law of Thermodynamics, Heat Engine and Heat Pump, Efficiency

Disease factor

Week 14	Chapter 5: The Second Law of Thermodynamics, Entropy. Entropy and Processes.
Week 15	Chapter 5: The Second Law of Thermodynamics, Entropy Increase Principles
Week 16	Preparatory Week Before the Final Exam

11- Infrastructure:

1- Required textbooks

1. Rajput, R. K., 2005. A textbook of engineering thermodynamics. Laxmi Publications.

2. Borgnakke, C. and Sonntag, R.E., 2022. Fundamentals of thermodynamics. John Wiley & Sons.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of thermodynamics. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The course description provides a brief description of the main features of the course and the academic outcomes it is expected to achi

The typical student in the event of exploiting the learning opportunities available in the course. It must be compared with the program

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering MetalsCourse code: / ME213

4. Available forms of attendance: in-person or online

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course aims to provide students with a basic and comprehensive understanding of the properties and classification of metals and metallic materials used in engineering. The course also aims to expand students' knowledge of metal transformation and alloy processing processes, and to understand the effect of various factors such as chemical composition and temperature on the properties of metals, enabling them to apply this knowledge in designing and selecting appropriate materials for various engineering applications in an effective and safe manner.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Identify the scientific foundations of the structural components of minerals, including crystal structure.

And atomic bonds.

A2- The ability to classify metals into different types (ferrous, non-ferrous, alloys) and understand the properties of each.

Of it.

A3- To understand the concepts of phase transformations in mineral materials, including the reaction with different temperatures.

And its effect on metal structures.

A4- Enabling students to conduct microscopic examination, understand microscopic images and analyze them to extract informati

About the microscopic structure of minerals.

A5- Understanding the different manufacturing processes and their effect on the final properties of metal materials, such as:

Thermoforming and mechanical forming.

A6- Study how mineral materials behave under the influence of different forces and stresses, including concepts such as:

Jihad and passion, flexibility and plasticity.

B- The course's specific skill objectives

B1- Training students on how to conduct practical experiments and analyze results related to the properties of metals.

Such as tensile, compression and hardness tests.

B2- Teaching students how to use optical and electron microscopes to examine the internal structure.

For minerals and interpretation of microscopic images.

B3- Enable students to perform thermal changes of metals, and understand how to apply processes such as annealing.

Rapid cooling to improve metal properties.

B4- Developing students' skills in metal manufacturing processes including forming, smelting, casting,

Application of thermal and mechanical treatments.

B5- Teaching students how to evaluate and determine corrosion rates in metals, and apply appropriate preventive measures.

To increase corrosion resistance.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by the lecturers in small study groups and assessment and response to all work presented. The course objectives will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful images, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interactio

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the present

And defends it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in

The Messenger is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

Course structure 10.

1 week	Introduction to the course and its importance - Atomic structure - Bonding in materials
2 weeks	Crystal structure- Macro and micro structure- Crystal structure of cast and die cast alloys-
3 weeks	Mechanical properties of metals- Tensile and hardness testing
4 weeks	Verse Elastic and plastic deformation- Slip theory of deformation
5 weeks	Deformation by twinning- Cold working and its effects
Week 6	- Annealing of cold working metals - Hot working processes
Week 7	- Alloy formation - Strengthening by casting - Solid solutions
Week 8	- Intermetallic and alloyed compounds - Eutectic and eutectic transformations
Week 9	- Basic types of thermodynamic equilibrium diagrams: solid solution type - synthesis type
10 weeks	- Types of equilibrium thermograms: - Pretectonic type - Pearlite type

Week 11 - Iron-carbon diagram - Pearlite and cementite particles

Week 12 - Stages of thermal transformations in metal alloys - Annealing process and hardening method

The Tazridite

Week 13 Electrical and magnetic properties of metals - Effect of temperature and chemical

Week 14 composition Effect of fibers and composite materials on the properties of metals

Week 15 - Engineering applications of metallic

Week 16 materials, preparatory week before the final exam

Weekly conscious lab curriculum

Week 1: Lab 1: Introduction to the laboratory and equipment.

Week 2: Lab 2: Preparation of samples for microscopic investigation (cutting, mounting, grinding, and polishing). Week 3: Lab 3: Microscopic examination of different steel structures.

Week 4: Lab 4: Preparation of specimens for tensile and flexural tests.

Week 5: Lab 5: Microscopic investigation of alloy corrosion.

Week 6: Lab 6: Tensile testing and mechanical properties.

Week 7: Lab 7: Study of the effect of heat treatment on the structure of materials. Week 8: Lab 8: Torsion testing of materials.

Week 9: Lab 9: Vickers and Rockwell hardness measurements of different materials. Week 10: Lab 10: Brinell hardness and relationships between hardness measurements. Week 11: Lab 11: Longitudinal thermal expansion of different materials.

Week 12: Lab 12: Microscopic Investigation of Cast Iron.

Week 13: Lab 13: Demonstration.

Week 14: Lab 14: Exam Preparation.

Week 15: Lab 15: Final Exam.

11- Infrastructure:

1- Required textbooks

Physical Metallurgy Principles, by Reza Abbaschian, Robert E. Reed -• Hill, and Richard E. Smallman

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering metals using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

Description of the academic program and its courses **Updated: July 2024**

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Mechanics of Materials / Course Code ME214

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main objective of studying the mechanics of materials is to provide the engineer with the means to analyze and design various machines and structures that carry loads. To explain how materials react to different types of stress under a variety of conditions. Since the engineering design of various components and structures used in the work is done using different types of materials, it is necessary to understand the basic behavior of these materials.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Introducing students to the concept of load result, its consequences, and how to bear different types of loads by

Different types of organs using specific materials. **B-**

The course's specific skill objectives

B1- Applying understanding to the tolerance of different types of organs under different types of loadings

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by the lecturers in small study groups and assessment and response to all work presented. The course objectives will be conveyed through a variety of teaching methods.

PowerPoint presentations of chapter titles, definitions, charts, and several useful pictures will be provided.

In addition to a summary at the end of each chapter, the PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented t

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the mes

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

Course structure 10.

1 week Chapter One: Introduction to simple and complex jihad, types of loads, mechanical properties, Jihad and bowing

2 weeks Chapter One: Introduction to Jihad and Simple Bowing, Direct or Regular Jihad and Bowing, Jihad Curve - The Bend

Week 3 Chapter 1: Introduction to simple bending and stress, Poisson's ratio, shear stress, contact stress of composite bars

Week 4 Chapter 2: Introduction to shear forces and bending moments, types of loading, definition of types of work, convention of signs for shear forces and bending moments

5 weeks Chapter 2: Introduction to Shear Forces and Bending Moments, Shear Forces, Bending Moment

For different situations

Week 6 Chapter Two: Introduction to shear force and bending moment curves, the relationship between shear force

(W) and load intensity (M), bending moment (Q)

Week 7 Chapter 3: Introduction to the bending stress of the beam, simple bending theory, neutral axis

And sector coefficient.

Week 8 Chapter Three: Introduction to the bending stress of the threshold, compound bending and direct stress -

Decentralized downloading

Week 9 Chapter 4: Introduction to shear stress distribution, shear stress distribution resulting from bending,

applications to different sections.

10 weeks Chapter Five: Introduction to Slope and Curvature of Thresholds

Week 11 Chapter 5: Introduction to Slope and Curvature of Beams, Mohr's "Space Moments" Method

Week 12 Chapter 5: Introduction to Slope and Curvature of Beams, Continuous Beams - The "Three-

"Moments" by Chapron, fixed threshold (fixed at both ends).

Week 13 Student Offers

Week 14 Student Presentations

Week 15 Student presentations and a short test during

Week 16 the preparatory week before the final exam.

Weekly Lab Syllabus: Week 1,

Lab 1: Tensile Test Week 2,

Lab 2: Tensile Test

Week 3, Lab 3: Compression Test

Week 4, Lab 4: Compression Test

Week 5, Lab 5: Shear Test Week 6,

Lab 6: Shear Test Week 7, Lab 7:

Impact Test Week 8, Lab 8:

Impact Test Week 9, Lab 9:

Stiffness Test Week 10, Lab 10:

Stiffness Test Week 11, Lab 11:

Torsion Test Week 12, Lab 12:

Torsion Test Week 13, Lab 13:

Review Week 14, Lab 14: Exam

Week 15, Lab 15: Final Exam

11- Infrastructure:

1- Required textbooks

Mechanics of Materials I 3rd Edition - 1

Mechanics of Materials 8th edition - 2

Mechanics of Materials 6th Edition - 3

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites).

Library sites in some international universities.

B - Electronic references, Internet sites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering materials. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Mechanical Drawing / Course Code: ME215

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to teach students to understand and appreciate art drawing in an industrial society; to discover and develop their talents in the fields of art drawing and related techniques; to develop skills in solving technical problems in art drawing related to materials and processes; to develop sound and acceptable art drawing skills as required by industry; to be aware of the career opportunities available in art drawing and related fields; to possess practical knowledge and understanding in computer graphics applications; to develop skills in using drawing in the design process.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Obtaining information about the important tools for engineering drawing. This will provide the student with knowledge

Basics of drawing professions, art and means of communication

with others. A2- Understand the main idea of using dimensions in

engineering drawing. A3- Explain the principle of projection and dissection.

A4-Understanding intersection and development of

body surface and stabilizers. **B- The course's specific skill objectives**

B1- Learn how to draw shapes, angles, lines, etc., which is essential for an engineer.

B2-Identify different drawing equipment, technical standards and procedures for creating engineering designs. This will provide

Students will be able to draw 3D objects on paper and create pictorial drawings.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **Course structure 10.**

1 week Introduction - A general review of font types, strokes, segments, and dimensions using hand and software.

AutoCAD

2 weeks Bolts and fasteners Types of bolts and nuts, Assembly drawing of fastening system. Key and groove

3 weeks connections, Types of keys and their uses, Assembly drawing of key system. Welding joints, Welding

4 weeks symbols, Assembly drawing of welding system with explanation of welding symbols. Rivets and screw

5 weeks connections, Types of rivets and screw connections, Short test Assembly drawing of rivet system

Week 6

Week 7 Midterm exam

Week 8 Springs, types of springs and their uses.

Week 9 Assembly drawing of a compression spring.

10 weeks Assembly drawing. Short test.

Week 11 Types of gears, gear definitions, gear drawing, and gear system assembly drawing

Gears are not rated.

Week 12 Principle of inequalities

Week 13 Principle of suitability

Week 14 Assembly drawing

Week 15 Disassembly drawing

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

Main References (Sources) -2 • Systematic engineering drawing book,

author Jaafar Al-Khafaf

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering materials. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Computer Programming / Course Code: ME216

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course provides a smooth introduction to the MATLAB computing environment, and is aimed at both beginners and those looking for a refresher. It is designed to give students a basic understanding of MATLAB, including common tools. The course consists of interactive lectures and typical MATLAB problems that are given as assignments and discussed in class. No previous programming experience or knowledge of MATLAB is assumed. Concepts covered include using the basics, graphical representations, and tips for designing and implementing MATLAB code.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Clarifying the basic concepts of programming in MATLAB language through a set of programming instructions. A2- Acquiring skills in dealing with programming problems and issues.

A3- Acquiring basic skills as an introduction to building large and applied programs.

A4- Basic understanding of how programmed systems work in various industrial applications.

B- The course's specific skill objectives

B1- Ability to program and design application programs.

B2- Ability to think about how to address a particular problem or

B3- issue. Writing scientific reports.

B4- Ability to gain experience in dealing with programmed systems.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall.

A2- The answer: Monitoring the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

A6- Enhancing awareness of the importance of energy and its various forms, such as potential energy, kinetic energy, internal energy, a

Flow or anatomical.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)**

D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss. **D4-**Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems

Course structure 10.

1 week	Introduction to MATLAB language and writing codes to use it
2 weeks	Types of constants, variables, and arithmetic expressions.
3 weeks	Write a simple array and how to use the address to find any element in it
4 weeks	Write a regular array and how to use indexing to find any element in it
5 weeks	Standard arrays: identity array, zero array, and identity array. Operations
Week 6	on arrays
Week 7	Arithmetic operations between a matrix and an odd number or between matrices
Week 8	Search a part of an array and use the code to find the sum of the array elements or The element is large or small in it.
Week 9	Perform and evaluate relational and logical operations.
10 weeks	Standard and logical operators, if-then-end form, switch-case-and-repeat form, and
Week 11	iterative and recursive statements.
Week 12	A format for storing variables and loading them from a file.

Week 13 Handling files

Week 14 Orient the chart and draw parts of the charts

Week 15 A great function that deals with one or more variables as inputs and one variable as output.

Week 16 The preparatory week before the final exam

Weekly conscious lab curriculum

Week 1-2: Lab 1 - Steps to create, compile, and execute a program using MATLAB. Week 3-4: Lab 2 - Implement programs for matrices (one and two dimensions).

Week 5-6: Lab 3 - Implementing programs for conditional statements (if statement). Week 7-8: Lab 4 - Implementing programs for conditional statements (switch statement). Week 9-10: Lab 5 - Implementing programs for recursive statements (for statement). Week 11-12: Lab 6 - Implementing programs for drawing graphs and parts thereof. Week 13-14: Lab 7 - Solving differential equations.

Week 15: Lab 8 - Implementing programs for drawing 2D and 3D graphs.

11- Infrastructure:

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of programming. Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive programming tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course name/code: Baath Party Crimes

4. Available forms of attendance: in-person attendance

5. Semester/Year First Semester/Second Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to provide a comprehensive understanding of the crimes of the Baath Party regime in Iraq through an analysis of the Iraqi High Criminal Court Law of 2005, and to clarify the types of crimes and human rights violations committed by the regime. The focus will be on the psychological and social dimensions of these crimes and their effects on society and the individual, in addition to reviewing environmental, military and political violations.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understanding the historical and political context of the Baath Party regime in Iraq. A2- Learning about the history and development of the Baath Party.

A3- Analyzing the political circumstances that led to the rise of the party. A4- Knowing the types of crimes and classifying them.

A5- Definition of crime in language and terminology.

A6- Classifying crimes into criminal, political, economic, etc. A7- Understanding the concept of primary crimes

A8- Understand the different types of international crimes (genocide, war crimes, crimes against humanity). A9- Analyze real-life examples of these crimes.

A10- Identifying the laws and decisions related to the crimes of the Baath

A11- regime. Studying the texts of the Iraqi Supreme Criminal Court Law of

A12- 2005. Reviewing the decisions issued by the court.

B- The course's specific skill objectives

B1- Reading and understanding the law of the Iraqi High Criminal Court. B2- Analyzing legal texts and applying them to real cases. B3- Research and documentation skills

B4- Accurately document crimes and violations.

B5- Using primary and secondary sources in research.

Teaching and learning methods

Scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by lecturers in small study groups and all work presented is evaluated and responded to.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

H-**Emotional and value goals**.

A6- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A7- Response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A8- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A9- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A10- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level.

In the messenger, he is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to complete assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. **10. Course Structure**

Week 1: Introduction to the topic, an overview of the Baath Party regime in Iraq, the historical and political context of the regime, crimes of the Baath regime according to the Iraqi High Criminal Court Law of 2005

Introduction to the Iraqi High Criminal Court Law Texts of the law related to Baath Party crimes The concept of crimes and their types Definition of crime in language and terminology

Crimes Sections (Criminal, Political, Economic, etc.)

Second Week:

Crimes of the Baath regime according to the documentation of the Iraqi Supreme Criminal Court Law of 2005 Documentation of crimes and evidence, prominent cases addressed by the court, types of state crimes Definition of state crimes, examples of state crimes (genocide, war crimes, crimes against humanity), decisions issued by the Supreme Criminal Court, the most prominent decisions and rulings, their impact on justice and society

Third week: Psychological and social crimes and their effects, analysis of the psychological impact of crimes on individuals and society, the most prominent violations of the Baathist regime in Iraq

Week Four: Psychological Crimes, Types of Psychological Crimes, Case Study

Week Five: Verses on psychological crimes, how psychological crimes are carried out, tactics used

The effects of psychological crimes, short- and long-term effects, social crimes, types of social crimes and their

impact. The sixth week: Militarization of society, the impact of militarization of society on daily life, the position of the Baath regime on the y

Regime policies towards the yen and yen practices, violations of Iraqi laws, various violations of national

laws

Week Seven: Images of human rights violations and crimes of power, examples of human rights violations,

some decisions of political and military violations of the Baath regime, review of prominent decisions Week

Eight: Prisons and detention centers of the Baath regime, a look at detention centers

Environmental crimes of the Baath regime, analysis of environmental crimes and their impact

Week 9: War and radioactive pollution and mine explosions in (Basra) Case study War and

radioactive pollution and mine explosions (Halabja city), another case study

Week 10: Destruction of cities and villages (scorched earth policy), analysis of policies and their

effects Week 11: Drying of marshes, study of the effects of drying of marshes on the environment and society

Week Twelve: Destruction of palm groves, trees and crops, the impact of the regime's agricultural policies, mass

grave crimes, introduction to mass grave crimes

Week Thirteen: Events of the genocidal graves committed by the Baathist regime in Iraq, a case study of the

chronological classification of the genocidal graves in Iraq for the period 1963-2003, classification and analysis

Week 14: Mass graves of the victims of the 1991 popular uprising, case study and analysis Week 15: General

review of the material Summary and comprehensive review, open discussion and final analysis

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks. 2-

Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering MathematicsCourse code: / E221

4. Available forms of attendance: in-person attendance

5. Semester/Year Second Semester/Second Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course aims to teach about mathematical methods. Know the calculation procedures. Develop students'

understanding of mathematical methods useful in engineering calculations. Study and solve applications using mathematics.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Gain a broad knowledge of mathematical methods useful in mechanical engineering. A2- Develop the ability to apply mathematics in solving engineering problems and applications. A3- Enhance the student's understanding of the practical applications of mathematics in the field of mechanical engineering. A4- Enable the student to use mathematics effectively in engineering calculations and analyses. **B- The course's specific skill objectives**

B1- Acquire the ability to apply mathematical methods in solving mechanical engineering problems.

B2- Develop skills in using mathematics in engineering analysis and design.

B3- Learn how to use effective mathematical methods to deal with various calculations and applications in mechanical engineering.

B4-Enhance the ability to think critically and analytically in using mathematics to solve engineering problems.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems **Course structure 10.**

1 week Chapter One: Differential Equations, Basic Definitions, Solutions of Equations of the System First: Separable variables, Solutions of first order equations: Exact

Week 2 Chapter 1: Differential Equations, Solutions of First Order Equations: Linear, Solutions of First Order Equations: Bernoulli

Week 3 Chapter 1: Differential equations, solutions of equations of the second order and higher orders: linear equations with constant conditions, linear equations that must be consistent with constant conditions, short test

4 weeks Chapter One: Differential Equations, Non-Rational Equations, Solving Non-Rational Equations, Change parameters, assign

Week 5 Chapter 1: Differential equations, higher order linear equations with constant conditions, D operator, Cauchy equation. Test

Week 6 Chapter 2: Place Transformation, Definition of Place Transformation, Basic Properties of Place Transformation

Week 7 Chapter 2: Transformation of Places, Transformation of Places of Elementary Functions

Week 8 Chapter 2: Place Transform, Place Transform of f(t(̂e)at, Place Transform of f(t)̂n

• Midterm exam

Week 9 Chapter 2: Transformation of Plus, Inverse Transformation of Plus.

10 weeks Chapter 2: Place Transform, Solving Differential Equations Using Place Transform, Test short

Week 11 Chapter 3: Infinite Sequences and Series, Introduction, Convergence and Divergence

Week 12 Test Chapter 3: Infinite Sequences and Series, Geometric Series and Sum Partial, assignment

Week 13 Chapter Three: Infinite Sequences and Series, Integration Test, Comparison, Proportion And the root

Week 14 Chapter 3: Infinite Sequences and Series, Alternating Series, Series The secret

Week 15 Chapter 3: Infinite Sequences and Series, Taylor and Maclaurin Series, Applications of series

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

- George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano - Thomas's Calculus

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in engineering mathematics using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practice in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Fluid Mechanics in Motion/Course Code: ME222

4. Available forms of attendance: in-person attendance

5. Semester/Year Second Semester/Second Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The overall objectives of the Dynamic Fluid Mechanics course are to provide students with a strong foundation in the fundamentals of dynamic fluid mechanics, problem solving skills, practical knowledge, and a mindset for continuous learning and the use of fluid mechanics in various engineering situations.

9.**Course Outcomes, Teaching, Learning and Evaluation Methods A- Cognitive Objectives**

A1- Understanding the basics of fluid flow and dynamics: Basic definitions of parameters and terms such as field Acceleration, velocity and velocity, velocity, and flow lines.

A2- Understanding the control volume relationship for fluid analysis: Definition of control volume and basic derivatives of conservati (Mass, momentum, and energy) and applications of Euler and Bernoulli's equations.

A3- Understanding viscous internal flow: Fully developed turbulent and calm flow, coefficient of friction and its relationship With Reynolds number, and the relationship of Dars-Weiss-Bach.

A4- Identifying secondary losses in installations: Studying losses in installations such as valves, reducers, Expanders, filters, elbows and fixation of aesthetic losses.

A5- Understanding the boundary layer: Definition of boundary layer flow, boundary layer thickness, displacement thickness, and mo Quiet and turbulent boundary layer, von Kármán theory.

A6- Understanding flow measurements: Principles of electromagnetic, ultrasonic, and wire flow meters Hot, differential pressure flow meters. **B- The course's specific skill objectives**

B1- Application of fluid flow analysis methods: Application of basic definitions and equations for analysis and solution Fluid flow problems.

B2- Solving viscous internal flow problems: Using the Dress-Weiss-Bach relationship to calculate the coefficient Friction and identification of major and minor losses in the system.

B3- Boundary layer application: Analyze the boundary layer flow and apply relevant theories to determine the thickness. Boundaries and flow behavior.

B4- Measurement and analysis of fluid flow: Use of various measuring devices to determine and process flow data.

Liquids

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student’s ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems.

Course structure 10.

Week 1 Flow and Kinematics Basics: Basic definitions of parameters and terms governing flow. Fluids, such as: acceleration field, velocity and non-velocity flow, etc.

Week 2 Flow and Kinematics Basics: Basic definitions of parameters and terms governing fluid flow, such as: flow, flow lines: path line, line of descent, line of affinity. Flow visualization, etc.

Week 3 Control Volume Relationship for Fluid Analysis: Definition of control volume and basic derivatives of conservation equations (conservation of mass and momentum).

Week 4 Control Volume Relationship for Fluid Analysis: Definition of control volume and basic derivatives of energy equations (energy conservation), Euler and Bernoulli equations.

Week 5 Control Volume Relationship for Fluid Analysis: Applications of Bernoulli's Equations and Applications of the Momentum Eq

Fixed and mobile.

Week 6 Control Volume Relationship for Fluid Analysis: Further Applications of the Momentum Equation to Fixed Blades And moving.

Week 7 Viscous internal flow: The fully developed calm and turbulent flow between parallel plates and within Pipes.

Week 8 Viscous internal flow: Coefficient of friction and its relationship with Reynolds number (in quiescent flow) and with Pipe roughness in addition.

Week 9 Viscous Internal Flow: Explain the Dräss-Weissbach relationship and its use to calculate the coefficient of friction (principal losses).

Week 10 Viscous internal flow: Secondary losses in installations such as valves, reducers, Expanders, filters, and elbows are studied and should be included in the determination of aesthetic losses.

Week 11 Viscous Internal Flow: Further secondary losses in installations such as valves, reducers, expanders, filters, elbows are studied and should be included in the determination of aesthetic losses. Multiple piping systems are analyzed.

Week 12 Boundary Layer: Definition of boundary layer flow, boundary layer thickness, displacement thickness, and Momentum.

Week 13 Boundary layer: The calm and turbulent boundary layer above a flat plate, von Karman theory.

Week 14 Flow measurements: Measuring devices such as: electromagnetic flowmeter, flow meter Ultrasonic, hot wire flow meter, etc.

Week 15 Flow measurements: Principles of differential pressure flow meters. Other types of flow meters Flow.

Week 16 Preparatory week before the final exam

Weekly Lab Syllabus Week 1:

Properties of Fluids. Week 2: Dead

Weight Calibration. Week 3:

Pressure Gauges. Week 4:

Visualizing Flow in Channels. Week

5: Visualizing Flow in Channels.

Week 6: Static Pitot Tube. Week 7:

Static Pitot Tube.

Week 8: Presentation of Bernoulli's

Theorem. Week 9: Presentation of

Bernoulli's Theorem. Week 10: Reynolds'

Number. Week 11: Reynolds' Number.

Week 12: Flowmeter Measurement.

Week 13: Flowmeter Measurement.

Week 14: Corrosion.

Week 15: Erosion.

11- Infrastructure:

1- Required textbooks

•Fluid Mechanics. Frank M.

WHITE • Fluid Mechanics. C. Hibbeler

•Fundamental of fluid mechanics. Munson, okllohi

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of fluid mechanics using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory

Practical application in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: ThermodynamicsCourse code: / ME223

4. Available forms of attendance: in-person attendance

5. Semester/Year Second Semester/Second Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

To provide students with the ability to integrate the principles of classical thermodynamics and fluid mechanics to provide a basis for the subsequent analysis of industrial plant equipment and processes. To ensure that all students are able to approach the thermodynamic analysis of systems in a logical and systematic manner. To understand the laws of thermodynamics and appreciate their consequences. To develop some basic skills in analysis using the second law of thermodynamics. To have a thorough knowledge of thermal engineering systems.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Presenting the basics of the heat engine.

A2- Review the basic concepts of thermodynamics.

A3- Use thermodynamic relationships, graphs and tables to calculate different entities of the state. A4- Explain how the most common thermodynamic machines work, such as Otto, Diesel, Clausius-Ranken.

And Brighton.

A5- Explain the principles of the steam cycle process (Clausius-Ranken), the gas turbine process (Brayton) and the engine.

Internal combustion (Otto and Diesel) and solving problems related to these processes and the principles applied to increase efficiency.

A6- Determine the performance factor of refrigerators and heat pumps and compare it with refrigerators and heat pumps that ope

On the reverse Carnot cycle.

A7- Explain the behavior of gas mixtures in the thermodynamic system.

A8- Understand and apply the basic principles of thermodynamics to various thermal processes. A9- Develop skills in solving and analyzing problems related to thermal processes.

A10- Use graphs and thermodynamic tables effectively to interpret and analyze data.

The system.

B- The course's specific skill objectives

B1- Draw the operations on both the P-V and T-S graphs.

B2- Analyze air conditioning processes by applying the laws of thermodynamics.

B3- Apply the first and second laws to determine heat transfer, work, and changes in properties during

Processes that occur in closed and open systems.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogical method, and the active method. Scientific and research skills are developed from

During the teaching and learning activities. Analytical and problem-solving skills are further developed by a set of problems prepared by the lecturers in small study groups and assessment and response to all the work presented. The course objectives will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method.

According to the subject and the curriculum of the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1-Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5-Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6-Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Heat Engine Cycle - Heat Engine Cycle - Carnot Cycle and Ideal Gas.

Week 2 Chapter 1: Heat Engine Cycle - Heat Engine Cycle - Brayton Cycle.

Week 3, Chapter 2: Air Separator Cycle - Air Separator Cycle - Otto Cycle. Week 4, Chapter 2: Air Separator Cycle - Air Separator Cycle - Diesel Cycle.

Week 5 Chapter Two: Air Separated Cycle - Air Separated Cycle - Double Combustion Cycle. Chapter

Week 6 Three: Reverse Carnot Cycle - Air Refrigerator Operating on Reverse Carnot Cycle. Chapter Three:

Week 7 Reverse Carnot Cycle - Refrigeration Cycles.

Week 8 Chapter 4: Steam Power Plant - Simple Rankine Cycle. Chapter

Week 9 4: Steam Power Plant - Superheated Rankine Cycle.

Week 10 Chapter 5: Positive Displacement Compressors - Reciprocating Machines.

Week 11 Chapter 5: Positive displacement compressors - minimum working conditions, isothermal efficiency and volumetric efficiency.

Week 12 Chapter 5: Positive Displacement Compressors - Multistage Compression.

Week 13 Chapter 6: Gas Mixtures - Dalton's Law, Gibbs-Dalton's Law and Volumetric Analysis of Gas Mixtures.

Week 14 Chapter 6: Gas Mixtures - Molecular Weight, Gas Constant and Specific Heat of Gas

Mixtures. Week 15 Chapter 6: Gas Mixtures - Diabatic Mixing of Gas Mixtures.

Week 16 Preparatory week before the final exam

Weekly lab syllabus

Week 1 Lab 1: Identify different measuring instruments. Week 2 Lab

2: Identify different measuring instruments. Week 3 Lab 3:

Determine the specific heat capacity of liquids. Week 4 Lab 4:

Determine the specific heat capacity of liquids. Week 5 Lab 5:

Determine the specific heat capacity of solids.

Week 6 Lab 6: Determination of specific heat capacity of solids. Week 7 Lab

7: Experimental investigation of Boyle's law and atmospheric pressure.

Week 8 Lab 8: Experimental investigation of Boyle's law and atmospheric

pressure. Week 9 Lab 9: Coefficient of linear expansion of metals.

Week 10 Lab 10: Coefficient of linear expansion of metals.

Week 11 Lab 11: Thermoelectric voltage.

Week 12 Lab 12: Thermocouple

Voltage. Week 13 Lab 13: Review.

Week 14 Lab 14: Test. Week

15 Lab 15: Final Test.

11- Infrastructure:

1- Required textbooks

- Rajput, R. K., 2005. A textbook of engineering thermodynamics. Laxmi Publications.
- Borgnakke, C. and Sonntag, R.E., 2022. Fundamentals of thermodynamics. John Wiley & Sons.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and techniques in the field of thermodynamics using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical applications in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Materials Resistance/Course Code: ME224

4. Available forms of attendance: in-person attendance

5. Semester/Year Second Semester/Second Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Since the engineering design of the various components and structures used in the application is done using different types of materials, it is essential to understand the basic behavior of these materials.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understand the theoretical foundations of simple torsion and the second polar moment of the region.

A2- Know the complex stress systems and how to deal with complex stresses, bending and torsion.

A3- Understand the analysis of stresses and strains and the ability to analyze stresses on inclined planes. A4- Learn how to analyze stresses and strains in materials subjected to pure shear and complex stresses. **A5-**Gain knowledge in strain energy analysis under different types of loading. **B-**

The course's specific skill objectives

B1- Ability to apply the simple torsion theory in the analysis of complex columns.

B2- Use the graphical solution and Mohr's stress circle to analyze stresses.

B3- Analysis of complex systems such as thin and thick cylinders under the influence of internal pressure. B4- Application of Castigliano's theorem to calculate displacement.

B5- The ability to use the relationship between the circles of jihad and emotion to analyze jihad and emotions.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students

By employing technology, a dialogue approach, and an active approach, scientific and research skills are developed through teaching and learning activities. Analytical and problem-solving skills are further developed through a set of problems prepared by the lecturers through small study groups and assessment and response to all the work presented. The objectives of the course will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method.

According to the subject and the curriculum of the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Introduction to torsion, Simple torsion theory, Polar second moment of area, Polar section coefficient of compound column

Week 2 Chapter 1: Introduction to Torsion, Compound Strut Systems, Bending and Compound Torsion, Compound Bending

Week 3 Chapter 1: Introduction to Torsion, Torsion and Direct Action, Bolted Columns

Torsion in non-ironic shapes

Week 4 Chapter 2: Introduction to the Analysis of Jihad and Passion, Jihad Analysis, Jihads on Inclined Planes, Direct Jihad, Short Test

Week 5 Chapter 2: Introduction to stress and strain analysis, matter subjected to pure shear, matter subjected to direct and mutually perpendicular stresses, matter subjected to direct stresses and compound shear, short test

Week 6 Chapter 2: Introduction to the analysis of the struggle and the reaction, the inclination of the main plane in terms of the associated main struggle, the graphical solution - Mohr's struggle circle, the analysis of the reaction, the linear reaction for the case of the two- and three-axis struggle

Week 7 Chapter 3: Introduction to stress and strain analysis, mean temperature, laminar flow and turbulence in pipes

Week 8 Chapter 3: Introduction to stress and strain analysis, main stresses in terms of stresses, bulk modulus K and bulk strain, relationship between elastic constants E, G, K and v, stresses on an inclined plane (direct and shear)

Week 9 Chapter 3: Introduction to the Analysis of Struggle and Emotion, Main Emotion - Mohr's Circle of Emotion The Relationship between Mohr's Circles of Struggle and Emotion, Short Test

Week 10 Chapter 4: Introduction to Strain Energy, Strain Energy for Different Types of Loads, Sudden Loads, Quiz

Week 11 Chapter 4: Introduction to Strain Energy, Castigliano's First Displacement Theorem

Week 12 Chapter 4: Introduction to the thin cylinder, thin cylinders under internal pressure, circular or circumferential stress, longitudinal stress, changes in dimensions

Week 13 Chapter 5: Introduction to the Thin Cylinder, the Thin Spherical Shell Under Internal Pressure

Change in internal volume, vessels subject to fluid pressure, cylindrical vessel with spherical ends, thin wire-wrapped cylinders

Week 14 Chapter 5: Introduction to Thick Cylinders, Development of the Lemme Theory, Thick Cylinder - Internal Pressure Only, Longitudinal Stress, Change in Cylinder Dimensions, Composite Cylinders

Week 15 Chapter 5: Introduction to the Mayor, Euler's Theorem, Euler's Validity Limit, Rankine or Rankine-Gordon Formula

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

Strength of Materials 3rd Edition.•

Mechanics of Materials, Ninth Edition, 2014, Published by Pearson•

Prentice Hall RC Hibbeler

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering materials using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops

Practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. **Educational Institution: University of Maysan**
2. **Scientific Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code: Engineering MetalsCourse code: / ME 234**
4. **Available forms of attendance: in-person attendance**
5. **Semester/Year Second Semester/Second Stage**
6. **Total number of vertical hours (30) hours.**
7. **Date of preparation of this description: July 2024**

8.**Course objectives:**

This course aims to identify the mechanical properties of metals and alloys. Learn the thermal equilibrium diagrams. Identify simple carbon steel and its heat treatment. Also, distinguish the types of alloy steel. Understand cast iron and non-ferrous metals and alloys. Understand polymers and their properties. Types of corrosion, its causes, and its damages.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Identify the mechanical properties of metals and alloys. A2-

Learn the graphs of thermal equilibrium.

A3- Identifying simple carbon steel and heat treating it. A4-

Understanding cast iron and non-ferrous metals and alloys. A5-

Understanding polymers and their properties.

A6-Types of corrosion, its effects, and its harms. **B- The course's**

specific skill objectives B1- Conducting tensile and hardness tests.

B2- Applying the theories of elastic and plastic deformation. B3-

Identifying cold and hot working techniques and their effects. B4-

Analyzing thermal equilibrium graphs.

B5- Application of heat treatment processes for simple carbon steel. B6-

Testing the hardening ability of steel.

B7- Study the effect of alloying elements on different types of steel.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Simple carbon steel (PCS), Effect of other elements present in simple carbon steel. Week 2: Classification and uses of simple carbon steel. Complete iron-carbon diagram.

Week 3: Heat treatment of simple carbon steel, quenching (process quenching, full quenching).

Week 4: Alloy forming, tempering. Hardenability, end-hardening test. Tempering.

Week 5: Heat treatment of simple carbon steel. Isothermal transformation of lucite. Week 6:

Martensitic hardening. Intermediate hardening.

Week 7: Alloy steels, effect of alloying elements. Manganese steel. Nickel

steel. Week 8: Chromium steel. Nickel-chromium low alloy steel. Quiz.

Week 9: Alloy steels, Silicon steel. Stainless steel.

Week 10: Heat-resistant steel. High-speed steel. Magnetic alloys. Week

11: Cast iron, white and gray cast iron. Structure of gray cast iron

Week 12: Malleable cast iron. High performance cast iron. Spheroidal graphite cast iron. Cast iron alloys. Heat treatment of cast iron.

Week 13: Non-ferrous metals and alloys, Copper and its alloys. Aluminium and its alloys. Zinc and its alloys.

Week 14: Polymers Classification of polymers. Synthetic polymers and their properties. Polymer blends and compositions. Polymer processing and testing.

Week 15: Corrosion, types of corrosion and its signs. Harmful

effects of corrosion. Week 16: Preparatory week before the final exam

12- Infrastructure:

2- Required textbooks

Physical Metallurgy Principles, by Reza Abbaschian, Robert E. Reed -•
Hill, and Richard E. Smallman

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

13. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering metals using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering Analysis / Course Code: E311

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Students in this course will apply advanced mathematical techniques to solve engineering problems, including complex integration and equivalence imaging. They will delve into the properties and applications of special functions such as the gamma function. In addition, they will understand the concept and properties of Fourier series representation, and apply them to the analysis of function functions and the solution of engineering problems with function phenomena. The course includes a study of the properties and applications of odd and even function functions, as well as half-range series for approximating these function functions. The course will also cover complex Fourier series and their applications, as well as Fourier integration techniques for solving ordinary differential equations, and an understanding of Bessel function and linear function functions. The course will also cover partial differential equations, their classifications, and their application in modeling and solving engineering problems, including wave and heat equations using separation of variables. Finally, stu

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Analyze and solve engineering problems using complex variable techniques, including complex integration.

And equivalent photography.

A2- Understand and apply special functions such as the gamma function to solve mathematical and engineering problems effectiv

A3- Analyze and solve engineering problems using Fourier series, with an understanding of the representation of the four-dimensi

And its applications in engineering.

A4- Apply the concepts of odd and even series and half-range series to approximate and analyze engineering problems.

Which includes individual parents.

A5- Using complex Fourier series and half-range expansion to analyze and approximate complex ore series

that you face in engineering.

A6-Use Laplacian transformation techniques to solve ordinary differential equations, including problems

Initial values, and interpretation of results in engineering

contexts. **B- The course's specific skill objectives**

B1- Analyze and solve engineering problems involving partial differential equations, understand their classifications, and choose appropriate solution techniques.

B2- Apply partial wave equation solutions to analyze and model wave phenomena in engineering systems. B3- Apply partial heat equation solutions to analyze and model heat transfer phenomena in engineering systems.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interactio

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the present

And defends it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in

The Messenger is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Complex variables and equations, complex equations, continuity and differentiation, Cauchy-Riemann equations, and complex integrals.

Week 2 Chapter 1: Complex variables and equations, complex equations, gamma function.

Week 3 Chapter 1: Complex variables and parents, integration on paths, equivalence imaging, short test

Week 4 Chapter 2: Fourier series and integration, Fourier series, Fourier series for sine and cosine.

Week 5 Chapter 2: Fourier series and integration, complex Fourier series, odd and even functions and half-domain expansion.

Week 6 Chapter 2: Fourier Series and Integration, Fourier Integration. Short Test

Week 7 Chapter 3: Transforming Plus, Transforming Plus, Transforming Plus for Derivatives and Integrals.

Week 8 Chapter 3: Transformation of Plus, Transformation of Special Functions, Inverse Transformation of Plus. Quiz

Week 9 Chapter 4: Solving Ordinary Differential Equations, Ordinary Differential Equations, Solving Ordinary Differential Equations Using the Place Transform.

Week 10 Chapter 4: Solving Ordinary Differential Equations, Solving Ordinary Differential Equations Using the D Operator

Week 11 Chapter 4: Solving Ordinary Differential Equations, Bessel Functions and Lander Functions. Short Quiz

Week 12 Chapter 5: Partial Differential Equations

• Partial differential equation, D'Alembert's transverse solution of the one-dimensional wave equation.

Week 13 Chapter 5: Partial Differential Equations, Using Separation of Variables to Solve Partial Differential Equations, Solving the One-Dimensional Diffusion Equation.

Week 14 Chapter 6: Probability and Statistics, Statistics and Statistical Variables.

Week 15 Chapter 6: Probability and Statistics, Arrangements and Combinations, Probability and Distribution. Week 16 Preparatory Week Before Final Exam

11- Infrastructure:

1- Required textbooks

1. Advanced Engineering Mathematics, 10th edition by Kreyszig, E. Wiley 2011

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering analysis using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course name/code: Heat transferCourse code: / ME312

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to learn the methods of heat transfer. Study the laws of heat transfer and their calculations.

Develop an understanding of heat load calculations in heat transfer systems. Identify the relationships that have

been studied. Study heat transfer applications. Identify the most important design parameters for heat transfer applications and syster

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Introducing heat transfer

methods. A2- Identifying how heat is transferred.

A3- Identify heat transfer by thermal conduction in the steady state of surface bodies. A4-

Identify heat transfer by thermal conduction in the steady state of inertial bodies. A5- Define

the total heat transfer coefficient.

A6- Description of heat source systems. A7-

Discussion and analysis of the extended

surface. A8- Definition of thermal contact

resistance. A9- Discussion of the system of aggregate heat capacity.

A10- Explain the transient heat flow in semi-infinite steel. A11- Identify the physical mechanisms and special properties of the beam. A12- Define the shape factor of the beam.

A13- Identify the heat exchange between non-black bodies and an infinite parallel surface. **A14-** Explain ray shields, solar radiation, and the effect of radiation on temperature measurement. **B- The course's specific skill objectives**

B1- Apply heat transfer methods to solve specific engineering problems.

B2- Analyze and calculate heat transfer laws and apply them practically.

B3- Use heat load calculations for heat transfer systems. B4- Determine the relationships related to heat transfer.

B5- Study heat transfer applications in various engineering fields. B6- Identify the most important design parameters for heat transfer applications and systems. B7- Analyze and discuss the expanded surface accurately.

B8- Estimate and define the thermal contact resistance effectively. B9- Apply the system of aggregate heat capacity in heat transfer calculations.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter.

PPT presentations detailing completely new topics and unsolved examples will be solved on a whiteboard and displayed for students to review.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams
-

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

- The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.
- The theoretical presentation method using the (show data) device and relying on the (how and why) method for the topic

According to the curriculum of the

subject. **Evaluation methods**

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Introduction, Heat Transfer Method

Week 2 Chapter 1: Introduction, Thermal Conduction

Week 3 Chapter 2: Steady-state conduction, flat wall Week 4

Chapter 2: Steady-state conduction, radial systems

Week 5 Chapter 2: Steady-state conduction, total heat transfer coefficient, critical insulation thickness, short test

Week 6 Chapter 2: Steady-state conduction, heat source systems

Week 7 Chapter 2: Steady-state conduction, extended surface

Week 8 Chapter 2: Steady-state conduction, extended surface, thermal resistance Week 9

Chapter 3: Unsteady-state conduction, introduction, aggregate heat capacity system

Week 10 Chapter 3: Conduction in the Unsteady State, Heat Flow in Semi-Infinite Solids, Test

Week 11 Chapter 3: Conduction in unsteady state, load boundary conditions

Week 12 Chapter 4: Introduction to beam, physical mechanism, beam properties

Week 13 Chapter 4: Introduction to beam, beam shape factor

Week 14 Chapter 4: Introduction to radiation, heat exchange between non-black bodies, infinite parallel surfaces

Week 15 Chapter 4: Introduction to Beam, Beam Shields and Solar Beam, Effect of Beam on Temperature Measurement

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Seventh Edition, . 2011

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of heat transfer Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Theory of Communication / Course Code: 313 ME

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to learn linear velocities, angles and acceleration. Cam and camshaft motions and design. Gear terminology and contact stresses. Role and design of flywheels.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Understand velocity and acceleration graphs, including linear and angular motions.

A2- Know how to calculate the velocity of points on a rolling object.

A3- Identify linear acceleration and angles. A4-

Understand the concept of equivalent links and the

Curius component. A5- Identify cams, relays and their different types.

A6- Knowing how to create displacement graphs, types of motions and build cam profiles. A7-

Identifying the basic terms of gears, their requirements and classifications.

A8- Understand the terms, definitions and analysis procedures for geared

wheels. A9- Know the contact ratios and number of teeth in gears.

A10- Understanding gear trains.

A11- Know the masses used in aviation wheels and their applications in internal combustion

A12- engines. Know the TMD coefficients and related links.

A13- Identify machine design problems.

B- The course's specific skill objectives

B1- Apply velocity and acceleration graphs to calculate linear and angular velocities and accelerations. B2-

Analyze and interpret motions on a rolling body and use equivalent connections.

B3- Create displacement graphs and design different cam profiles. B4- Analyze gear

requirements and classify them and understand the contact ratios and number of

teeth. B5- Apply analysis procedures to design gear trains.

B6- Calculate the masses used in flywheels and apply them in the design of internal combustion engines. B7-

Solve machine design problems and analyze the links related to TMD.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1 Chapter 1: Introduction to velocity and acceleration diagrams, Introduction to motion (linear and angular).

Week 2 Chapter 1: Introduction to velocity and acceleration diagrams, Velocity of points on a rolling body. Week 3

Chapter 2: Introduction to velocity and acceleration diagrams, Introduction to linear and angular accelerations. Week

4 Chapter 2: Introduction to velocity and acceleration diagrams, Equivalent link and Curius component.

Week 5 Chapter 3: Introduction to words and sequences, Introduction., Types of words and sequences. Test.

Week 6 Chapter 3: Cams and sequences, displacement graphs. Types of motion. Creating a cam profile.

Week 7 Chapter 3: Cams and gears, creating a cam profile. Week 8 Chapter 4: Introduction to gears, introduction and basic terminology of gears. Gear requirements and classifications.

Week 9 Chapter 4: Introduction to gears, terms, definitions and analysis procedures. Contact ratio and tooth count.

Week 10 Chapter 4: Introduction to Gears, Gear Trains. Week

11 Chapter 5: Flywheels, Introduction. Flywheel Block.

Week 12 Chapter 5: Flywheels, Flywheels in Internal Combustion Engines.

Test.

Week 13 Chapter 5: Flywheels, TMD Transactions and Related Links

Week 14 Review

Week 15 Chapter 6: Introduction to Machine Design Introduction to Design Problems

Week 16 Preparatory Week Before the Final Exam

Weekly conscious lab curriculum

Week 1 Lab 1: Speed of a sliding crankshaft.

Week 2 Lab 2: Velocity of the four and five member verses. Week

3 Lab 3: Acceleration of the sliding crank verse.

Week 4 Lab 4: Acceleration of the four and five member verses.

Week 5 Lab 5: Simple Harmonic Motion Cams (SHM) Week

6 Lab 6: Uniform Acceleration and Deceleration Cams (UAR)

Week 7 Lab 7: SHM and UAR Cam Profiles

Week 8 Lab 8: Complete Profiles for UAR

Week 9 Lab 9: Gears and Cogs Week 10 Lab

10: Classification of Gears.

Week 11 Lab 11: Gear trains.

Week 12 Lab 12: Flywheels and the Moment of Inertia of Mass.

Week 13 Lab 13: Review.

Week 14 Lab 14: Test. Week

15 Lab 15: Final Exam.

11- Infrastructure:

2- Required textbooks

1. The theory of Machines by Robert W. Angus First Edition Part I.

2. Theory of Machines and Mechanisms by John J. Dicker, Jordon R. Penock and Joseph E. Shigley

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and techniques in the field of engineering theory using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical applications in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It s

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course name/code: Internal Combustion EnginesCourse code: / ME314

4. Available forms of attendance: in-person or online

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to teach the basics of internal combustion engines, analyze standard air flows, and perform engine operation calculations. It also includes a description of different engine systems and a study of the difference between the Wankel engine and the reciprocating engine.

9.**Course Outcomes, Teaching, Learning and**

Evaluation Methods A- Cognitive Objectives

A1- Gain knowledge about internal combustion engines.

A2- Understand the differences between types of internal combustion engines.

A3- Use standard air cycle analysis to calculate the thermal characteristics of engines. A4- Study the systems used to support engine operation.

A5-Gain knowledge about Wankel engine performance. **B- The course's specific skill objectives** B1- Calculate engine operating parameters.

B2- Discuss the differences between the Wankel engine and the reciprocating engine.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter.

PPT presentations detailing completely new topics and unsolved examples will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Basic Engine Types and Operation. Introduction to the reciprocating engine and basic engine terminology.

Week 2: Chapter 1: Basic Engine Types and Operation. Spark Ignition Engine. Week 3: Chapter 1: Basic Engine Types and Operation. Spark Ignition Engine. Week 4: Chapter 1: Basic Engine Types and Operation. Incoming Engines.

Week 5: Chapter 2: Engine Power and Performance. Basic measurements of power and specific effective average pressure. Week 6: Chapter 2: Engine Power and Performance. Pointer power, braking power and frictional power. Test.

Week 7: Chapter 2: Engine Power and Performance. Average effective power and specific fuel consumption.

Week 8: Chapter 3: Thermodynamics of internal combustion engines. Approximation of the air cycle and the importance of thermal efficiency. Theoretical cycles and estimates.

Week 9: Chapter 3: Thermodynamics of internal combustion engines. Air cycle calculations, air cycle efficiency and the effect of engine variables.

Week 10: Chapter 3: Thermodynamics of internal combustion engines. Use of fuel-air cycle and scope of fuel-air cycle.

Week 11: Chapter 3: Thermodynamics of Internal Combustion Engines. Actual Engine Cycle.

Week 12: Chapter 4: Supercharged Engines and Their Performance. Definitions and Supercharging Chapter.

Week 13: Chapter 4: Supercharged Engines and Their Performance. Supercharging of spark ignition engines and supercharging of diesel engines. Test.

Week 14: Chapter 4: Supercharged Engines and Their Performance. Performance calculations and the effect of operating variables on supercharged engines.

Week 15: Chapter 5: Wankel Engine. Comparison between Wankel Engine and Reciprocating Engine and

Performance of Wankel Engine. Week 16 Preparation Week before Final Exam

Weekly conscious lab curriculum

Week 1 & 2 Lab 1: Spark ignition engine operation.(SI)

Week 3 & 4 Lab 2: Compression Ignition Engine Operation.

Weeks 5 and 6 Lab 3: Work.

Week 7 and 8 Lab 4: Ability.

Week 9 and 10 Lab 5: Indicator, braking, and frictional parameters.

Week 11 & 12 Lab 6: Engine Exhaust Analysis.

Week 13 Lab 13: Review.

Week 14 Lab 14: Exam.

Week 15 Lab 15: Final Exam.

11- Infrastructure:

1- Required textbooks

1. Engineering Fundamentals of the Internal Combustion Engine.

Willard W. Pulkrabek. University of Wisconsin

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and technology in the field of internal combustion engines using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical applications in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Gas Dynamics / Course Code: ME315

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to derive the main and fundamental equations governing compressible flow at different speeds and flow conditions starting from thermodynamic and fluid basics, distinguish compressible flow into four different flow states according to its speed, apply compressible flow conditions to channels with variable areas using ideal flow conditions (Eisentrope flow), consider the effect of normal shock wave on ideal compressible flow in a channel with variable area, consider the effect of friction on ideal compressible flow in a channel with constant area (Fanoa channel), consider the effect of heat addition or absorption on ideal compressible flow in a channel with constant area (Rayleigh channel), and analyze the drag force and efficiency of turbojet, turbofan and turboprop engines.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understand the basic equations governing compressible flow under specific conditions.

A2- Distinguish between the different states and conditions of compressible flow.

A3- Determine the characteristics of compressible flow in the ideal flow condition using ideal flow conditions.

(Eisentropic flow) in a channel of variable area.

A4- Determine the properties of compressible flow when exposed to a normal shock wave in a channel with an area of Variable

A5- Determine the characteristics of compressible flow under different flow conditions taking into account the effect of friction. Heat transfer in a channel of constant area.

A6-Calculate the efficiency of turbojet engines. **B-**

The course's specific skill objectives

B1- The ability to use mathematics and physics to apply basic equations to calculate the properties of compressible flow.

B2- Be able to analyze and interpret the properties of compressible flow in different states according to flow conditions and influencing factors such as friction and heat transfer.

B3- Applying and evaluating the efficiency of turbojet engines, understanding the factors affecting them, and analyzing the results of the calculations.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Fundamentals of Compressible Flow, Introduction to the basic equations and relationships of compressible flow. Review of some of the thermal relationships used in compressible flow.

Week 2 Chapter 1: Fundamentals of compressible flow, freezing states, Mach waves and Mach cones. Week 3 Chapter 2: Isotonic flow, Isotonic flow through channels of variable area. Quiz

Week 4 Chapter 2: Elissotropic flow, nozzles and expanders - convergent nozzles and convergent-expanding nozzles and their applications. Use of gas streams.

Week 5 Chapter 2: Elissotropic flow, nozzles and expanders - convergent nozzles and convergent-expanding nozzles and their applications. Use of gas streams.

Week 6 Chapter 2: Elestrobe Flow, Nozzles and Expanders - Convergent Nozzles and Convergent-Expanding Nozzles and Their Applications. Use of Gas Tables. Short Quiz

Week 7 Chapter 3: Normal and Oblique Shock Waves, Governing Equations - Changing Flow Parameters Through Normal Shock Waves.

Week 8 Chapter 3: Normal and Oblique Shock Waves, Governing Equations - Changing Flow Parameters Through Oblique Shock Waves.

Week 9 Chapter 3: Normal and Oblique Shock Waves, Brandl-Meyer Relationships - Using Tables and Graphs. Quiz

Week 10 Chapter 4: Flow through Channels, Flow through Constant Area Channels with Friction (Fano Flow) - Using Tables and Graphs - Generalized Gas Dynamics.

Week 11 Chapter 4: Flow through Channels, Flow through Constant Area Channels with Heat Transfer (Rayleigh Flow) - Using Tables and Graphs - Generalized Gas Dynamics.

Week 12 Chapter 4: Flow through Channels, Flow through Constant Area Channels with Friction (Fano Flow) and Heat Transfer (Rayleigh Flow) - Using Tables and Graphs - Generalized Gas Dynamics.

Short exam

Week 13 Chapter 5: Aircraft Action, Aircraft Action Theory - Action Equation - Action Force and Action Efficiency - Operating principle, cycle analysis and use of stalled state performance of turbojet, turbofan and turboprop engines.

Week 14 Chapter 5: Aircraft Action, Aircraft Action Theory - Action Equation - Action Force and Action Efficiency - Principle of operation, analysis of the cycle and use of stalled state performance of turbojet, turbofan and turboprop engines. Short exam

Week 15 Chapter 5: Aircraft, Rocket Engine Week

16 Preparatory Week Before Final Exam

11- Infrastructure:

1- Required textbooks

1. Michel A. Saad, “Compressible Fluid Flow, Second Edition”.

2.Genick Bar Meir, 2013, “Fundamental of Compressible Fluid Mechanics

3. Asher H. Shapiro, 1953, “The Dynamic and Thermodynamic of compressible fluid flow”, Volume I.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of gas dynamics using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Electrical MachinesCourse code: / ME316

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The objective of this course is to provide students with a comprehensive and in-depth understanding of the principles and theories associated with the operation of various electrical machines, including electric motors and electric motors. This understanding is achieved through the study of the basic principles, electric force equations, equivalent circuits, and examination of voltage and efficiency variations as well as the operating performance characteristics of various types of major electric motors and electric motors. This is achieved through a combination of theoretical concepts, practical tests and experimental evaluations, with the aim of enabling students to analyze, design and impleme

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Learn and understand the basic principles of operation of electrical machines, including motors and generators (voltage And magnetic stimulation).

A2- The ability to understand and use electromotive force (EMF) equations and related equations.

By leakage reactions and equivalent charges.

A3- Ability to calculate and implement evaluations related to voltage regulation and efficiency of electrical machines.

A4- Understand how the magnetic field is produced, analyze the synchronous speed and slip, and interpret the equivalent circuits. And speed torque curves.

B- The course's specific skill objectives

B1- Acquiring practical skills to operate and maintain different types of electrical machines such as motors. And malls.

B2- Developing the ability to diagnose common faults in electrical machines and apply effective solutions to fix them.

B3- Use electrical measuring devices such as meters, voltmeters and digital measuring units to evaluate the performance of electrical machines.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams. C-

Emotional and value goals.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented to

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5-Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6-Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1 Introduction to Electrical Machines: Definition and applications of electrical machines. - General classifications of electrical machines.

Week 2: Basic principles of electrical machines: Fundamentals of magnetic and electric fields. - Faraday and Lenz's laws.

Week 3 Types and methods of electrical connection: Types of conductors and methods of connection. - Direct current (DC) and alternating current (AC) circuits.

Week 4 Electrical Malls: - Basic principles of mall operation. - Types of malls and their uses. Week 5 Electrical Malls: Basic principles of mall operation. - Types of malls and their uses. Week 6 Electrical Malls: Basic principles of mall operation. - Types of malls and their uses. Week 7 Synchronous Machines: - Principles of synchronous machine operation

Week 8 Types of electrical transformers: - Principles of operation of electrical transformers. - Types of transformers and their uses. Week 9 Motor control: - Motor speed control techniques. - Motor control systems.

Week 10 Efficiency of electrical machines: - Methods of improving the efficiency of electrical machines. - Things that affect the efficiency of machines.

Week 11 of routine maintenance and repair Basics of routine maintenance of machines. - Troubleshooting and repair.

Week 12 Electrical Analysis and Charts Using charts to understand the performance of machines. - Performance analysis using modern programs.

Week 13 Advanced Applications: Advanced applications in industry and energy. - Future of electrical machines and modern innovations.

Week 14 Specific projects to apply the acquired knowledge. - Practical sessions for training on the operation and maintenance of machines. Week 15 Review

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Edward Hughes - Hughes electrical and electronic technology [electronic resource]-Pearson Education (2012).pdf

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technology in the field of electrical machines using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Manufacturing ProcessesCourse code: / ME317

4. Available forms of attendance: in-person attendance

5. Chapter/Year First Semester/Third Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The objective of this course is to provide students with a comprehensive understanding of the basic principles and

practical techniques involved in the production and processing of metals. This course aims to enable students to

acquire the knowledge and skills necessary to analyze, design and improve manufacturing processes for various metal products, ensur

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understand the basic principles of iron and steel making

processes. A2- Describe the characteristics and techniques of different casting processes.

A3- Explain the principles of metal forming processes, including hot and cold working.

A4- Identify the differences between different metal cutting and forming processes.

A5- Understand how lathes work and their applications in metalworking.

B- The course's specific skill objectives

B1- Analysis and selection of appropriate materials and processes for manufacturing various metal products.

B2- Carrying out sand casting and die casting operations, including preparation, shaping and finishing. B3- Carrying out metal forming operations such as forming, rolling, extrusion and drawing.

B4- Operating lathe machines to perform various operating tasks. **B5-** Conducting tests and examinations to ensure the quality of metal products.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction b

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented to

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the me

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Introduction to Manufacturing Processes - Overview of the Iron and Steel Industry - Introduction to Iron Ore and Cast Iron Making

Week 2 Cast Iron Making Process- Blast Furnace Operation- Introduction to Steel Making Processes

Week 3 Steel Making Processes- Fundamentals of Casting and Characteristics of Casting Processes

Week 4 Introduction to sand casting - Sand materials and sand testing - Patterns and molding techniques

Week 5 Casting furnaces - Cleaning and inspection of cast products - Pressure casting methods

Week 6 Other Casting Methods: Centrifugal Casting-Lost Wax Casting-Clamshell Forming Week 7 Casting-Introduction to Metal Forming-Hot Working of Metals

Week 8 Cold working of metals - Types of blacksmithing operations - Hand blacksmithing tools

Week 9 Automatic blacksmithing - Rolling machines - Calculating the contact angle in the roll

Week 10 Hot and cold rolling operations - Extrusion methods - Pipe extrusion

Week 11 Impact Extrusion - Wire Drawing Machines - Pipe Drawing Machines

S Week 12 Preparing Metal for Drawing-Sheet Metal Forming Processes-Sheet Metal Joints S

Week 13 SolderingMetal Cutting: Carving, Filling, Sawing

Week 14 Introduction to lathe operations - Types of lathe machines - Parts of lathe

machines Week 15 Lathe as a multi-purpose machine - General review of the curriculum

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Manufacturing processes, second edition; HN Gupta, RC Gupta, Arun Mittal; Published by New Age International (P) Ltd., Publishers.
2. Fundamentals of Modern Manufacturing, Materials, Processes, and Systems, fourth edition; Mikell P. Groover; JOHN WILEY & SONS, INC.
3. Principles of metal manufacturing processes (1999); J. Beddoes, M. Bibby.
4. Manufacturing Engineering and Technology, Sixth edition; Serope Kalpakjian, Steven R. Schmid.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and technologies in the field of manufacturing processes using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical application in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should b

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Numerical Analysis / Course Code: E321

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main course aims to study the methods of numerical analysis and its applications in mechanical engineering. It also aims to solve mechanical engineering problems using numerical analysis techniques. In addition, the course aims to learn the basics of programming languages and write simple codes using MATLAB.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Apply numerical calculation methods to solve linear algebraic equations and simultaneous linear equations. A2- Understand the basics of finite difference and filling methods.

A3- Understanding numerical differential and integral calculus.

A4- Apply appropriate methods to overcome the obstacles to representing experimental data. A5- Understand the numerical solution of ordinary differential equations.

A6- Understanding the numerical solution of partial differential equations. **A7-**Understand the basic concepts of the finite element method. **B- The course's specific skill objectives**

B1- Solve mechanical engineering problems numerically using the programming language (MATLAB language).

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems.

D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Solving Linear Algebraic Equations - Fixed Point Iteration Method and Newton-Raphson Method

Week 2: Chapter 2: Solving equations of simultaneous linear systems - Gauss-S-Del method and Gauss elimination method

Week 3: Chapter 2: Solving equations of simultaneous linear systems - Gauss elimination method (continued) - Gauss-Jordan method - Short test

Week 4: Chapter 3: Specific Differences and Generalization - Foreground, background and central differences

Week 5: Chapter 3: Definite Differences and Generalization - New Generalization Method and Lagrange's Method of Generalization - Short Quiz

Week 6: Chapter 4: Numerical Differentiation and Integration - Numerical Differentiation, Trapezoidal Method, Simpson's Method, and Gauss's Quadrat Method

Week 7: Chapter 5: Collection Cavities - Linear and Polynomial Collection Cavities - Quiz Week 8: Chapter 5: Collection Cavities - Soil Collection Cavities and Strong Wall Cavities

Week 9: Chapter 6: Numerical Solution of Ordinary Differential Equations - Euler's First Orders Method and Modified Euler's Method - Short Test

Week 10: Chapter 6: Numerical Solution of Ordinary Differential Equations - Runge-Kutta First Order Method, Euler Second Order Method, and Runge-Kutta Second Order Method

Week 11: Chapter 7: Numerical Solution of Partial Equations - Solving a Place Equation in 2D - Short Test

Week 12: Chapter 7: Numerical Solution of Partial Equations - Solving the Wave Equation

Week 13: Chapter 7: Numerical Solution of Partial Equations - Solving the Heat Equation

Week 14: Chapter 8: Introduction to the Finite Element Method - Residuals, Galerkin Method, Shape Functions, Analytical Approach, and Finite Element Method Steps

Week 15: Chapter 8: Introduction to the Finite Element Method - Solving problems of stress analysis in one dimension, and solving problems of heat transfer

Week 16 Preparatory week before the final exam

Weekly lab syllabus

Week 1-2: Code programming language to find the roots of nonlinear equations.

Week 3-4: Code programming language for matrix results from systems of linear algebraic equations. Week 5: Code programming language for generalization.

Week 6-7: Code programming language for numerical integration. Week 8-9: Code programming language for bending.

Week 10-12: Code programming language for solving numerical ordinary differential equations.

Week 13-15: Code programming language for solving numerical partial differential equations using the final difference method.

11- Infrastructure:

1- Required textbooks

Applications Using MATLAB. by Amos Gilat and Vish, Wiley 3rd edition, 1.
Numerical Methods for Engineers and Scientists", An Introduction with
2014

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of numerical analysis Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Heat Transfer II / Course Code: ME322

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main course aims to provide students with the necessary knowledge about heat transfer methods, laws and how to calculate them. It seeks to develop students' understanding of calculating heat loads in heat transfer systems, in addition to enabling them to identify the relationships that have been studied. It also focuses on studying heat transfer applications and identifying the most important design criteria related to these applications and systems, which enhances their ability to design and analyze heat transfer systems efficiently.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Providing students with the necessary knowledge about the methods of heat transfer. A2- Identifying the laws of heat transfer and how to calculate them.

A3- Understanding the calculation of thermal loads in heat transfer systems. **A4-**Identify the relationships studied in the context of heat transfer. **B- The course's specific skill objectives**

B1- Developing students' skills in calculating heat loads for heat transfer systems. B2- Studying heat transfer applications and applying them in practical situations.

B3- Identify important design criteria related to heat transfer applications and systems. B4- Enhance students' abilities to design and analyze heat transfer systems efficiently.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presentec

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messag

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Introduction to Convection, Velocity Boundary Layer

Week 2: Chapter 1: Introduction to Convection, Velocity Boundary Layer

Week 3: Chapter 1: Introduction to Convection, Counter Analysis, Dimensional Sets Week 4:

Chapter 2: Introduction to External Flow, Steady State Forced Convection, Friction Factors

Week 5: Chapter 2: Introduction to External Flow, Empirical Relationship for External Flow, Short Quiz

Week 6: Chapter 2: Introduction to External Flow, Flow around a Cylinder and Sphere, Flow around Tube Bundles

Week 7: Chapter 3: Introduction to Internal Flow, Average Temperature, Laminar and Turbulent Flow in Pipes

Week 8: Chapter 3: Introduction to Internal Flow, Hydrodynamic and Thermal Inflow Area Week 9:

Chapter 3: Introduction to Internal Flow, Empirical Relationship for Pipe Flow

Week 10: Chapter 4: Introduction to Natural Convection, Free Convection from a Vertical Plate, Free Convection from an Inclined Plate, Short Quiz

Week 11: Chapter 4: Introduction to Natural Convection, Free Convection from a Horizontal Plate

Week 12: Chapter 4: Introduction to Natural Convection, Free Convection from a Cylinder and a Sphere

Week 13: Chapter 5: Introduction to Heat Exchangers, Types of Heat Exchangers, Pollution Factor Report Submission

Week 14: Chapter 5: Introduction to Heat Exchangers, Heat Exchanger Analysis, Countercurrent Heat Exchangers

Week 15: Chapter 5: Introduction to Heat Exchangers, Logarithmic Difference of Medium Temperature, NTU-Efficiency Method

Week 16 Preparatory week before the final exam

Weekly lab syllabus

Week 1: Lab 1: Linear and axial beam heat transfer in solids Week 2: Lab 2: Linear and axial beam heat transfer in solids Week 3: Lab 3: Extended surface efficiency (Papis fins)

Week 4: Lab 4: Extended Surface Efficiency (Babies Fins) Week 5: Lab 5: Beam Heat Transfer Experiment

Week 6: Lab 6: Heat Transfer by Ray Experiment

Week 7: Lab 7: Heat Transfer by Natural and Forced Convection

Week 8: Lab 8: Heat Transfer by Natural and Forced Convection

Week 9: Lab 9: Shell and Tube Heat Exchanger

Performance Week 10: Lab 10: Shell and Tube Heat

Exchanger Performance Week 11: Lab 11: Crossflow Heat

Exchanger Week 12: Lab 12: Crossflow Heat Exchanger

Week 13: Lab 13: Review

Week 14: Lab 14: Test Week

15: Lab 15: Final Test

11- Infrastructure:

1- Required textbooks

1. Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Seventh Edition, . 2011

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of heat transfer Using textbooks, scientific articles, educational videos, and interactive programs Including case studies and applied projects that link theory and practical applications in engineering Encouraging discussions, group work, and active learning through workshops

Practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Theory of Machines / Course Code: 323 ME

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The core course aims to provide students with a comprehensive understanding of linear and angular velocities and accelerations, cam and follower motions and design, gear terminology and contact stresses, and the role and design of flywheels. This course helps students develop the skills necessary to analyze and design complex mechanical systems that include these components.

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Understanding the concepts of velocity and acceleration graphs and their applications in linear and angular motions.

A2- Identify the types of cams and followers and understand the uses of each type.

A3- Study gear terminology and understand their effects on the design of mechanical systems. **A4-**Analysis of the role of flying wheels in the stability and performance of engines. **B- The course's specific skill objectives**

B1- Ability to draw and interpret velocity and acceleration graphs for linear and angular motions. B2- Apply graphs to calculate point velocities on rolling bodies. B3- Design and build cam files based on specific motion requirements.

B4- Analysis and selection of suitable gear types for different mechanical applications.

B5- Calculation and design of flywheels to meet the requirements of system stability and performance.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Introduction to velocity and acceleration graphs, Introduction to motion (linear and angular).

Week 2: Chapter 1: Introduction to velocity and acceleration graphs, Velocity of points on a rolling body. Week 3: Chapter 2: Introduction to velocity and acceleration graphs, Introduction to linear and angular accelerations.

Week 4: Chapter 2: Introduction to velocity and acceleration graphs, Parabolic connection and Coriolis components. Week 5: Chapter 3: Introduction to cams and followers, Introduction.

Week 6: Chapter 3: Words and Followers, Confusion Graphics. Types of Motions. Building a Cam File.

Week 7: Chapter 3: Words and Followers, Building a Cam File.

Week 8: Chapter 4: Introduction to Gears, Introduction and Terminology of Gears. Gear Requirements and Gear Classifications.

Week 9: Chapter 4: Introduction to gears, terms, definitions and analysis procedures. Contact ratio and tooth count.

Week 10: Chapter 4: Introduction to Gears, Gear Systems. Week 11: Chapter 5: Flywheels, Introduction.

Week 12: Chapter 5: Flywheels, Flywheels for Internal Combustion Engines. Quiz.

Week 13: Chapter 5: Flywheels TMD and Related Parameters.

Week 14: Review

Week 15: Chapter 6: Introduction to Machine Design, Introduction to Design

Problems Week 16 Preparatory Week Before Final Exam

Weekly conscious lab curriculum

Week 1: Lab 1: Crank Slider Mechanism Velocity Week 2: Lab 2:

Four- and Five-member Mechanism Velocity

Week 3: Lab 3: Crank Slider Mechanism Acceleration Week 4: Lab 4:

Four- and Five-member Mechanism Acceleration

Week 5: Lab 5: Simple Wave Motion Cams (SHM) Week 6:

Lab 6: Uniform Acceleration and Deceleration Cams (UAR)

Week 7: Lab 7: Cam files for simple wave motion and uniform acceleration and deceleration (SHM)

UAR)

Week 8: Lab 8: Cam files for uniform acceleration

and deceleration (UAR) Week 9: Lab 9: Gears and

Pinions Week 10: Lab 10: Classification of Gears

Week 11: Lab 11: Gear Trains

Week 12: Lab 12: Flywheels and Moment of Mass

Week 13: Lab 13: Review Week

14: Lab 14: Exam Week 15: Lab

15: Final Exam

11- Infrastructure:

1- Required textbooks

1. Theory of Machines by RS Khurmi.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of machine theory using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It should be

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Internal Combustion Engines II / Course Code: ME324

4. Available forms of attendance: in-person or online

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

Teach types of fuels for engines. Teach combustion chamber phenomena (knock, combustion, flame spread, and different flow movements). Develop your understanding of the combustion process and ignition system. Recognize the importance of general combustion theory. Describe different engine systems.

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Understanding the heating value of fuel and its importance in the combustion process.

A2- Identify the characteristics and classifications of spark and cumulative combustion engine fuels. A3- Study the carburetor process and carburetor systems and understand how performance variables affect their performance. A4- Analyze the general combustion theory and the factors affecting the flame propagation velocity and the rate of pressure increase. A5- Study fuel injection systems, types of cumulative combustion engines and factors affecti

A6-Identify engine cooling and lubrication systems and their potential problems. **B- The course's specific skill objectives** B1- The ability to calculate and evaluate the heating value of fuel.

B2- Apply information about the fuel properties of spark and cumulative combustion engines in system designs.

B3- Design and analyze the performance of carburetor systems and deal with their variables to improve performance.

B4- Use the general theory of combustion in performance evaluation and improvement. B5- Evaluate and select fuel injection systems and understand their effects on engine performance.

B6- Diagnose problems of cooling and lubrication systems and implement the necessary solutions to improve performance and efficienc

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)**

D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss. **D4-**Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Fuels for internal combustion engines and combustion calculations, heating value of fuels. Fuel classifications for spark-ignition engines.

Week 2: Chapter 1: Fuels for internal combustion engines and combustion calculations, important properties of fuels for spark-ignition engines.

Week 3: Chapter 1: Fuels for internal combustion engines and combustion calculations, properties and classifications of fuels for cumulative combustion engines. Combustion calculations.

Week 4: Chapter 2: Carburetors and carburetor process, main measuring system. Simple carburetor. Carburetor performance with measuring variables.

Week 5: Chapter 2: Carburetors and carburetor process, mixture control and types of carburetors. Injection carburetor.

Week 6: Chapter 3: Spark ignition, Ignition system requirements. Battery ignition system. Magneto ignition system. Spark plugs. Ignition timing. Quiz.

Week 7: Chapter 4: Combustion in spark-ignition engines, general combustion theory. Normal combustion and flame propagation.

Week 8: Chapter 4: Combustion in spark-ignition engines, factors affecting flame propagation rate. Rate of pressure rise. Abnormal combustion. Engine operating variables affecting detonation. Combustion chamber design.

Week 9: Chapter 5: Cumulative Combustion Engine and Fuel Injection System, General information related to the characteristics of the cumulative combustion engine.

Week 10: Chapter 5: Cumulative Combustion Engine and Fuel Injection System Types of cumulative combustion engines. Fuel delivery and injection systems. Typical solid injection systems. Injector nozzle.

Week 11: Chapter 6: Combustion in a Cumulative Combustion Engine, Combustion in a Cumulative Combustion Engine. Ignition Delay.

Week 12: Chapter 6: Combustion in a Cumulative Combustion Engine, Detonation Sound in a Cumulative Combustion Engine. Variables Affecting Ignition Delay. General Functions and Characteristics of the Combustion Chamber. Comparison of Some Basic Combustion Chamber Designs in a Cumulative Combustion Engine.

Week 13: Chapter 7: Cooling of Internal Combustion Engines Liquid cooling systems. Air cooling system. Engine cooling problems. Short test.

Week 14: Chapter 8: Lubrication in internal combustion engines, Lubrication verse. Types of bearings used in internal combustion engines. Properties of lubricating oils. Additives. Lubrication systems.

Week 15: Chapter 9: Engine design, initial analysis, number of cylinders, size and arrangement. Detailed design procedures.

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Engineering Fundamentals of the Internal Combustion Engine.

Willard W. Pulkrabek. University of Wisconsin.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and technology in the field of internal combustion engines using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical applications in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Turbine Machines/Course Code: ME325

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course aims to teach students how to distinguish between turbo machines according to various criteria, including the work done on or by the machine and the direction of flow. It also includes deriving the main equations governing turbo machines from their first principles, and deriving different types of efficiencies and energy for various types of turbo machines. In addition, the course deals with the use of analogy and simulation methods to design any prototype of a turbo machine using basic information from any standard turbo machine under similar design conditions. It also includes the analysis of the flow over the blade surfaces of any turbo machine and the use of the data obtained from these analyses to calculate the performance characteristics of the turbo machine.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understand the application of the first and second laws of thermodynamics to

turbomachinery. A2- Identify the classifications of dynamic vortex pumps, their components

and types of heads. A3- Understand and analyze velocity triangles and the effect of the outlet blade angle in centrifugal pumps.

A4- Know the concepts of cavitation, NPSH and specific speed in pumps and fans. A5-

Understand the performance characteristics of centrifugal pumps and choose the appropriate pumps.

A6- Study the types of water turbines such as action and reaction turbines and the laws of

similarity. A7- Identify axial and central compressors, analyze them and their performance characteristics.

A8-Understand gas turbine classifications, analyze speed diagrams, analyze multistage turbines and characteristics.

The disease.

B- The course's specific skill objectives

B1- Ability to apply the laws of thermodynamics to turbo machines. B2- Analysis and

classification of dynamic vortex pumps and understanding their effects on performance. B3-

Design and analysis of velocity triangles and blade angles to improve the performance of

centrifugal pumps. B4- Diagnose and solve problems of cavitation, NPSH and specific speed in

pumps. B5- Evaluation and selection of suitable pumps based on performance characteristics and requirements.

B6- Analysis of water turbine performance and application of similarity laws to turbine

design. B7- Design and analysis of axial and central compressors and understanding their effects on performance.

B8- Evaluate and analyze the performance of gas turbines and understand the construction details and performance characteristics to imp

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter.

The PPT presentations detail completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Introduction to Turbomachinery, application of the first and second laws of thermodynamics to turbomachinery.

Week 2: Chapter 2: Pumps and fans, classification of dynamic rotary pumps, components of centrifugal pump, types of heads, velocity triangles and their analysis, effect of outlet blade angle.

Week 3: Chapter 2: Pumps and fans, classification of dynamic rotary pumps, components of centrifugal pump, types of heads, velocity triangles and their analysis, effect of outlet blade angle.

Week 4: Chapter 2: Pumps and fans, cavitation, NPSH, specific speed.

Week 5: Chapter 2: Pumps and fans, cavitation, NPSH, specific speed. Quiz.

Week 6: Chapter 2: Pumps and fans, performance characteristics of the central pump, series and parallel operation of pumps, system resistance curve, selection of pumps.

Week 7: Chapter 3: Water Turbines, Pelton Type Turbine.

Week 8: Chapter 3: Water Turbines, Action Turbine - Pelton Type. Quiz. Week 9:

Chapter 3: Water Turbines, Reaction Turbine - Francis and Kaplan. Week 10:

Chapter 3: Water Turbines, Reaction Turbine - Francis and Kaplan.

Week 11: Chapter 3: Water Turbines, Law of Similarity in Water Turbines, Unit and Definite Quantities. Short Quiz.

Week 12: Chapter 4: Compressor, axial and centrifugal compressors, construction, phase velocity triangles and their analysis, flow through rows of blades, performance characteristics.

Week 13: Chapter 4: Compressor, Axial and Centrifugal Compressors, Construction, Phase Velocity Triangles and their Analysis, Flow through Rows of Blades, Performance Characteristics. Quiz.

Week 14: Chapter 5: Gas Turbine Classifications (axial and radial), construction details, speed diagrams and analysis (single and multistage turbines), control, performance characteristics.

Week 15: Chapter 5: Gas Turbine, Classifications (axial and radial), Construction details, Speed diagrams and analysis (single and multistage turbines), Control, Performance characteristics. Test.

Week 16 Preparatory week before the final exam

Weekly lab curriculum

Week 1-2: Central Hall Characteristics

Week 3-5: Parallel operation of central pumps

Week 6-8: Sequential operation of centrifugal pumps

Week 9-11: Pelton turbine

Week 12-14: Francis Turbine

11- Infrastructure:

1- Required textbooks

1. Turbomachinery Design and Theory, (2003), Rama SR Gorla, and Aijaz A. Khan .
2. Principles of Turbomachinery, (1995), R. K. Turton, Second Edition.
3. Fluid Mechanics, Thermodynamics of Turbomachinery, (1998) S.L. Dixon, B.Eng., P.H.D. Fourth Edition.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of turbine machines Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Electrical MachinesCourse code: / ME326

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (75) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The objective of this course is to provide students with a comprehensive understanding of the basic principles and practical applications of synchronous motors and drives, power rectification, and solid-state electronic devices. The course also aims to enable students to acquire the skills necessary to measure and analyze electrical and non-electrical parameters in industrial systems.

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Understand the basic equations and interactions in synchronous motors and synchronous motors. A2- Explain the operation of synchronous motors, starting methods and their applications.

A3- Identify different types of bridge circuits and electronic components such as diodes and transistors.

Power amplifiers, SCRs and their applications.

A4- Understanding the distribution of electrical energy in industrial facilities, distribution designs, lighting and heating.

A5-Measure and analyze electrical and non-electrical parameters such as current, voltage, power, pressure, speed,

Flow, temperature.

B- The course's specific skill objectives

B1- Calculation and regulation of voltage regulation in

synchronous motors. B2- Analysis and operation of synchronous motors and understanding of V curves.

B3- Installation and testing of bridge circuits and electronic components and their applications in

practical circuits. B4- Design and application of industrial power distribution systems and power factor correction.

B5- Measuring and recording electrical energy consumption and non-electrical parameters using different measuring tools.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams. C-

Emotional and value goals.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time.

D2- Logical and programming thinking to find programming solutions to different problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Introduction to synchronous electrical machines - EMF equation in synchronous motors

Week 2: Reaction of the armature in synchronous motors - Voltage regulation in synchronous motors Week 3: Synchronization in synchronous motors - Introduction to synchronous motors

Week 4: Principle of operation of synchronous motors - Methods of starting synchronous motors Week 5: V-curves in synchronous motors - Applications of synchronous motors

Week 6: Introduction to Solid State Electronic Components - Diodes and Their Basics

Week 7: Different Bridge Circuits - Transistors and Power Amplifiers

Week 8: SCRs and their applications - Design and application of bridge circuits Week 9: Industrial electrical power distribution methods - Design of power distribution in factories

Week 10: Distribution substations - Protection of electrical systems

Week 11: Relays and Circuit Breakers - Fire and Heating Designs Week 12: Power Factor Correction - Current, Voltage and Power Measurement

Week 13: Recording energy consumption - Measuring non-electrical parameters: pressure, velocity, flow, and temperature

Week 14: Extending the range of devices using a voltage divider - Review of practical applications Week 15: Comprehensive review of the course

Week 16: Preparatory week before the final exam

Weekly lab curriculum

Week 1: Lab 1: Introduction to AC Machine.

Week 2: Lab 2: Magnetic Saturation Curve.

Week 3: Lab 3: Testing a DC motor with independent excitation. Week 4: Lab 4: Testing a DC motor with parallel excitation. Week 5: Lab 5: Testing an open and short circuit of an inductor.

Week 6: Lab 6: Synchronization Test.

Week 7: Lab 7: Transmission Line.

11- Infrastructure:

1- Required textbooks

1. Edward Hughes - Hughes electrical and electronic technology [electronic resource]-Pearson Education (2012).pdf

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technology in the field of electrical machines using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

Description of the academic program and its courses **Updated: July 2024**

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Manufacturing ProcessesCourse code: / ME327

4. Available forms of attendance: in-person attendance

5. Semester / Year Second Semester / Third Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The objective of this course is to provide students with a deep understanding of the various principles and techniques used in forming, cutting, welding, and solid welding processes, as well as in the operation of conventional and modern machines including CNC machines and non-conventional methods of operation. This course aims to enable students to acquire the knowledge and skills necessary to apply these processes effectively in industry.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understand the classifications and applications of forming machines. A2- Describe the types of milling machines and their operations. A3- Explain the drilling operations and the machines used in them.

A4- Identify the types of grinding machines and the tools used.

A5- Understand the principles and techniques of various welding including arc welding and gas welding. A6- Know the techniques of fusion welding, solid state welding and non-conventional welding.

A7- Understand the differences between traditional machines and CNC machines and the financial and technical advantages of CN

A8-Learn about non-traditional machining techniques such as ultrasonic machining and machining.

Chemistry and electric spark operation. **B-**

The course's specific skill objectives

B1- Classification and application of different forming operations. B2- Operating milling machines and performing different operations on them. B3- Using drilling and boring machines skillfully.

B4- Carrying out grinding operations using different machines and tools. B5- Practical application of different welding techniques.

B6- Effectively perform fusion and solid-state welding operations. B7- Operate CNC machines and apply acquired skills in production.

B8- Using unconventional operating techniques to achieve efficiency and productivity.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The answer: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presente

And defends it.

A5-Forming value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the messa

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why)

method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Introduction to forming processes - Classification of forming

machines Week 2: Introduction to grinding processes - Types of grinding machines

Week 3: Drilling Operations: Types of Drills and Reamers - Drilling and Boring Machines Week

4: Introduction to Grinding Operations - Types of Grinding Machines

Week 5: Grinding Tools and Their Uses - Introduction to Welding Techniques

Week 6: Arc welding and metal arc welding - gas welding and plasma welding

Week 7: Fusion welding techniques: axy ethylene welding, heat welding, electron beam welding and laser welding

Week 8: Ultrasonic Welding and Diffusion Welding - Drop Welding and Spark Welding Week 9:

Electric Resistance Welding and Friction Welding - Explosion Welding

Week 10: Introduction to CNC - Definition of NC and comparison with conventional machines

Week 11: Financial and Technical Advantages of CNC Machines - Direct Numerical Control (DNC) and CAD/CAM Week 12: Hierarchical NC - Introduction to Non-Conventional Machining

Week 13: Ultrasonic and Chemical Machining - Electrochemical Machining and Electrospark Machining

Week 14: Electron Beam Machining and Laser Machining - Electron Grinding Week 15: Comprehensive Course Review

Week 16 Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Manufacturing processes, second edition; HN Gupta, RC Gupta, Arun Mittal; Published by New Age International (P) Ltd., Publishers.
2. Fundamentals of Modern Manufacturing, Materials, Processes, and Systems, fourth edition; Mikell P. Groover; JOHN WILEY & SONS, INC.
3. Principles of metal manufacturing processes (1999); J. Beddoes, M. Bibby.
4. Manufacturing Engineering and Technology, Sixth edition; Serope Kalpakjian, Steven R. Schmid.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and technologies in the field of manufacturing processes using textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical application in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Machine Parts Design I / Course Code: 411 ME

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (105) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This core course aims to analyze stress and strain and their role in mechanical design, and learn the theories of mechanical failure. It also aims to identify the factors of safety, their ranges and their importance. In addition, the course covers the types of curved beams and their load analysis, and how to design and select helical springs. The course also covers fatigue stress and how to determine the endurance limit, and design and selection of bolts and fasteners. It also covers the design and analysis of pressure vessels (thin and thick cylinders). Finally, the course aims to understand computer-aided design (CAD) and its use in mechanical design.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understand the basic design process including stresses, strains and strain energy. A2-

Know how to estimate safety factors, their importance and ranges.

A3- Analysis of stresses and strains in curved beams (tensile, bending and composite).

A4- Understanding the different elastic failure theories (yield stress theory, ultimate stress theory, shear stress theory) Maximum, Strain Energy Theory).

A5- Knowing the different types of springs and the stresses induced in them.

A6- Understand the characteristics of helical springs, spring index and induced stresses

in them. A7- Know the types and importance of stresses resulting from fatigue and how to analyze them.

A8- Understand the SN curve and how to achieve it and analyze the average and effective stresses of

oscillating loads. A9- Know the reliability of designed components.

A10- Understanding the different types of screws and threads and the stresses induced in them.

A11- Knowing how to design pressure vessels (thin and thick) and analyze the stresses induced in them.

A12-Understand the basics of computer-aided design (CAD) and its use in mechanical design.

B- The course's specific skill objectives

B1- Apply the design process to analyze stresses and strains in mechanical components. B2- Calculate and estimate safety factors in different designs.

B3- Analysis of stresses and strains in curved beams using appropriate theories. B4- Conducting tests to analyze stresses in machines and various mechanical components. B5- Design and selection of helical springs according to engineering standards.

B6- Apply the theories of elastic failure to analyze stresses in mechanical components.

B7- Conduct stress analyses resulting from fatigue and determine the endurance limit.

B8- Design and selection of bolts and fasteners based on load requirements. B9- Design and analysis of pressure vessels to ensure their safety and efficiency.

B10- Use of computer-aided design (CAD) programs in creating and analyzing mechanical designs.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems.

10. **Course structure**

Week 1: Chapter 1: Introduction to the design process. Basics of the design process, stresses and strains, and strain energy.

Week 2: Chapter 1: Introduction to the design process. Estimation of safety factors, their importance and scopes.

Week 3: Chapter 2: Stress and Strain Analysis. Stress and Strain Analysis of Curved Beams (Tension, Bending and Composite).

Week 4: Chapter 2: Analysis of stresses and strains. Elastic failure theories (yield stress theory, ultimate stress theory, ultimate shear stress theory, strain energy theory). Short test.

Week 5: Chapter 3: Introduction to spring design. Types of springs and the stresses induced in them.

Week 6: Chapter 3: Introduction to spring design, helical springs. Spring index. Induced stresses in helical springs.

Week 7: Chapter 4: Introduction to the failure of jihad resulting from fatigue. Jihad resulting from fatigue, its types and importance. Mix of loading modes.

Week 8: Chapter 4: Introduction to fatigue failure. Average and effective stresses of oscillating loads. SN curve and how to achieve it.

Week 9: Chapter 4: Introduction to fatigue failure. Reliability of designed components. Week 10:

Chapter 5: Introduction to screws and fasteners. Types of screws. Types of fasteners.

Week 11: Chapter 5: Introduction to screws and fasteners. Induced stresses in screws and their calculations.

Week 12: Chapter 5: Introduction to screws and fasteners. Strong screws, types of fasteners and induced stresses.

Week 13: Chapter 6: Introduction to pressure vessel design. Types of pressure vessels (thin and thick). Balance of external and internal forces. Short quiz.

Week 14: Chapter 6: Introduction to pressure vessels. Stresses induced by internal pressure in thin cylinders. Strains and changes in volume.

Week 15: Chapter 7: Introduction to Computer-Aided Design (CAD). Introduction to Computer-Aided Design (CAD).

Week 16: Preparatory week before the final exam

Weekly lab curriculum

Week 1: Lab 1: Connecting Mechanical Components.

Week 2: Lab 2: Calculating the stresses of three components in the verse.

Week 3: Lab 3: Failure Analysis of Mechanical Components.

Week 4: Lab 4: Initial and microscopic examinations of failure in mechanical components.

Week 5: Lab 5: Examples of analysis of curved beams (lifting hook and S-cell type load.)

Week 6: Lab 6: Tensile testing and strength factors.

Week 7: Lab 7: Modeling of Mechanical Components.

Week 8: Lab 8: Springs (leaf, torsional, and helical). Week 9:

Lab 9: Fatigue Tests "Reliability and Endurance." Week 10: Lab

10: Overview of Bolt and Fastener Manufacturing. Week 11:

Lab 11: Force Bolts (Bolt Leverage Analysis).

Week 12: Lab 12: Computer-Aided Design (CAD) Software and Design

Processes. Week 13: Lab 13: Review.

Week 14: Lab 14: Test. Week

15: Lab 15: Final Exam.

11- Infrastructure:

1- Required textbooks

11.Machine Design by RK Jain.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of machine parts design Using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Control/Course Code: ME412

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main objective of this course is to develop specific technical expertise in the analysis and design of feedback control systems. Develop problem-solving skills and an understanding of control theory through the application of various techniques. Understanding the ability to recognize and analyze feedback control mechanisms and design feedback control systems is one of the most important learning outcomes; as the principle of feedback is a universal principle behind many processes and devices encountered in mechanical engineering as well as in electrical engineering, computer science, physics, chemistry, biology, and others. Understand the mechanical elements used in control

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1-Students will be able to describe feedback control systems mathematically using equations.

Various, transfer functions, and state space models.

A2-Students will be able to analyze whether a given control system is stable or not, and what needs to be done to make it so.

I read it.

A3-Students will be able to define and explain the structure of feedback control and forward feedback, and discuss the importance of

Performance, robustness, and stability in control design.

A4-Students will be able to interpret and apply block diagrams of control systems and design controllers.

Based on PID experimental tuning rules.

A5-Students will be able to calculate the stability of linear systems using the Rath array test and using

This is to generate control design constraints. Students will be able to understand and find controllability and observability of control systems.

B- The course's specific skill objectives

B1- Students will be able to analyze how this is achieved (synthesis) and how the solution will affect the performance of the system (evalua

Students will gain confidence in solving any control system problems within the specified scope. B2- Students will be able to master control system design tools such as Matlab and Simulink. B3- Students will be able to use Evans root locus techniques in control design for real systems.

B4- Students will be able to calculate gain and phase margins from Bode plots and Nyquist plots.

And understand its effects in terms of strong stability.

B5- Students will be able to design Lead-Lag compensators based on frequency data of an open linear system.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by

Other programs and applications to display.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented t

And defends it.

A5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in the mes

He is neither lazy nor restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Introduction and Review of Mathematics (Chapter 1) Week 2: Introduction and Review of Mathematics (Chapter 1) Week 3: Modeling Physical Systems (Chapter 2)

Week 4: Modeling Physical Systems (Chapter 2) Week 5: System Responses (Chapter 4)

Week 6: System Responses (Chapter 4)

Week 7: Control System Characteristics and Stability Analysis (Chapters 5 and 6)

Week 8: Control System Characteristics and Stability Analysis (Chapters 5 and 6)

Week 9: Root Locus (Chapter 7)

Week 10: Root Location (Chapter 7)

Week 11: Bandwidth Analysis (Chapter 8)

Week 12: Bandwidth Analysis (Chapter 8)

Week 13: Bandwidth Tuning (Chapter 9)

Week 14: Bandwidth Tuning (Chapter 9)

Week 15: Final Exam Preparation Week 16: Final Exam Preparation Week

11- Infrastructure:

1- Required textbooks

1. Modern Control Engineering by Katsuhiko Ogata Frank P. Incropera, David P. Dewitt, Seventh Edition, 2011.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of control and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Air Conditioning and Refrigeration / Course Code: ME413

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The overall objective of the course is to provide students with a comprehensive understanding of the properties of air and water, analysis of stoichiometric processes for designing air conditioning systems, calculation of cooling and heating loads, and design of air distribution systems. The course aims to enable students to apply these concepts in the design and ope

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Understand the properties of air and water and the factors affecting air conditioning. A2- Use the stoichiometric diagram to analyze the different processes in air conditioning.

A3- Calculating cooling and heating loads based on different factors affecting human comfort. **A4-**Design air distribution systems and know the different design procedures. **B- The course's specific skill objectives**

B1- Conduct psychometric calculations and analyze data using a psychometric chart. B2- Accurately calculate cooling and heating loads for different design cases.

B3- Design air distribution systems using the correct methods and pressure loss analysis.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

- Surprise exams during the theoretical lecture.
- Semester exams for the theoretical part.
- Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Properties of Air and Water - Definition of Air Conditioning and Ventilation

Week 2: Law of Partial Pressures - Ideal Gas Law and Moisture Vapor Pressure

Week 3: Moist Air Terms: Humidity, Vapor Density, Relative Humidity, Volume of Moist Air, Dry-bulb and Wet-bulb Temperatures and Dew Point - Enthalpy of Moist Air and Saturation

Week 4: Psychrometric chart of air conditioning processes - air mixing and processes on the chart

Week 5: Sensor heating and cooling - evaporation and dehumidification, bypass and contact factors, sensor temperature ratio

Week 6: Calculating thermal loads: human comfort factors, comfort measures, effective temperature - selection of indoor and outdoor design conditions

Week 7: Heat transfer through walls and roof, design temperature of unconditioned spaces - solar radiation transmission through glass, shading, heat gain from walls and roof

Week 8: Heat loss from the human body and ventilation requirements - Heat loss from infiltration, opening methods and air exchange

Week 9: Lighting loads, various heat losses - Calculating aesthetic heat loads Week 10:

Calculating heating loads - Design calculation for heating systems

Week 11-Design of Air Distribution Systems: Duct Design Procedures, Equal Friction Method-Fans and Fan Laws, Single and Multi-Zone Fan Systems

Week 12: Air Distribution Outputs, System Pressure Losses - Preparation for Practical Experiments in Air Conditioning and Refrigeration Systems

Week 13: Conducting practical experiments - Analyzing the

performance of air conditioning systems Week 14: Practical applications and design models

Week 15: Comprehensive review of the course

Week 16: Preparatory week before the final exam

Weekly lab syllabus

Week 1: Lab 1: Introduction to the Properties of

Saturated Air Week 2: Lab 2: Introduction to the

Properties of Saturated Air Week 3: Lab 3: Psychometric

Drawings Week 4: Lab 4: Psychometric Drawings Week

5: Lab 5: Cooling and Dehumidification

S Week 6: Lab 6: Cooling and

Dehumidification S Week 7: Lab 7: Heating

and Humidification S Week 8: Lab 8: Heating and Humidification

S Week 9: Lab 9: Vapor Compression Refrigeration System S

Week 10: Lab 10: Vapor Compression Refrigeration System

S Week 11: Lab 11: Heat Pump

Week 12: Lab 12: Heat Pump

Week 13: Lab 13: Review Week

14: Lab 14: Exam Week 15: Lab

15: Final Exam

11- Infrastructure:

1- Required textbooks

1. Jones, W.P., 2007. Air conditioning engineering. Routledge.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of air conditioning and refrigeration, using textbooks, scientific

articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practice.

Practical in Engineering. Encourage discussions, teamwork, and active learning through workshops and hands-on activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It s

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering Materials/Course Code: ME415

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main objective of this course is that the mechanical engineering graduate can deal with the methods, applications, problems, calculations, and designs related to engineering materials.

9. Course outcomes, teaching, learning and assessment methods

A- Cognitive objectives

A1- Knowing different types of engineering materials.

A2- Naming different types of steel and identifying structural differences, distinguishing properties and typical uses.

To each their own.

A3- Naming the five types of cast iron, describing the microstructure and determining the general mechanical properties.

To each their own.

A4- Identify different types of non-ferrous alloys and determine their distinctive physical and mechanical properties.

A5- Explain the purposes and description of the following heat treatment procedures: process annealing, normalization, and annealing

Complete.

A6- Describe a typical polymer molecule in terms of its chain structure and how the molecule is generated from

repeating units. A7- Name and describe the four general types of polymer molecular structures and the four types

of copolymers. A8- Identify the differences in behavior and molecular structure between thermosetting polymers and thermosetting po

A9- Describe the process used to produce glass-ceramics. A10-

Name the types of clay products and forms of carbon.

A11- Identify three important requirements that must typically be met by refractory ceramics, abrasive ceramics

And cement.

A12-Name and describe some of the forming methods used to manufacture glass pieces.

B- The course's specific skill objectives

B1- Describe the verse that describes the propagation of cracks for both ductile and brittle

fracture modes. B2- Define fracture toughness and distinguish between fracture

toughness and plane fracture toughness. B3- Define fatigue and specify the conditions under which it occurs.

B4- Define creep and determine the conditions under which it occurs, determine the constant creep rate and the

age of collapse. B5- Distinguish between oxidation and reduction reactions in electrochemistry and explain the forms of corrosion and pre

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Chapter 1: Ferrous metals, carbon steel, low alloy steel.

Week 2: Chapter 1: Ferrous metals, heat treatments of carbon steel, stainless steel, cast iron.

Week 3: Chapter 2: Non-ferrous metals, copper, brass, bronze, copper-nickel alloys.

Week 4: Chapter 2: Non-ferrous metals, aluminium, wrought aluminium alloys, cast aluminium alloys, precipitation hardening process.

Week 5: Chapter 3: Polymers, Molecular structure of polymers, Addition and condensation polymerization, Degree of polymerization. Week 6: Chapter 3: Polymers

Thermosetting polymers and thermosetting polymers, mechanical behavior of polymers.

Week 7: Chapter 4: Ceramics, Crystalline Structures, Silicate Ceramics, Carbon, Defects in Ceramics, Diffusion in Ionic Materials.

Week 8: Chapter 4: Ceramics, Glass and Glass Ceramics, Clay Products, Refractory Materials, Abrasives, Cement, Advanced Ceramics.

Week 9: Chapter 5: Composite materials, macromolecular composites, diffusion reinforced composites, effect of fiber length, orientation and placement.

Week 10: Chapter 5: Composite Materials, Fibrous Phase, Matrix Phase, Polymer Matrix Composite Materials, Metal Matrix Composite Materials, Ceramic Matrix Composite Materials, Laminated Composite Materials, Sandwich Panels.

Week 11: Chapter 6: Mechanical properties of materials, elastic deformation, stress and strain behavior, elastic properties of materials, tensile properties, true stress and strain, hardness.

Week 12: Chapter 6: Fracture, Fracture Basics, Plastic Fracture, Brittle Fracture, Principles of Fracture Mechanics, Tear Test.

Week 13: Chapter 7: Fatigue, stresses, S-N curve, crack initiation and propagation.

Week 14: Chapter 8: Creep, General creep behavior, Effect of stress and temperature, Extrapolation methods (Larson-Miller methods), Alloys for use at high temperatures.

Week 15: Chapter 9: Corrosion, Electrochemical Considerations, Forms of Corrosion, Corrosion Prevention. Week 16: Preparatory Week Before Final Exam

11- Infrastructure:

2- Required textbooks

11.Materials Science and Engineering an Introduction, William D. Callister, JR. and David G. Rethwisch.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering materials and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Theory of Vibrations / Course Code: ME415

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to learn the basic concepts of vibrations. It aims to acquire the skills necessary to deal with engineering problems and cases related to vibrations. Calculate the deformation (response) of uncoupled and damped single-freedom systems resulting from initial compression, alternating force, radial load, and non-radial load. Find equivalent components of a mechanical vibration system. How to avoid resonance in mechanical systems. How to write the equations of motion and find the natural frequencies of vibrating systems using the energy equation, Newton's second law, and Lagrange's equation. Calculate the natural vibration modes and natural frequencies of single-freedom and multiple-freedom vibration systems.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Gain a basic understanding of mechanical vibrations and develop skills in analyzing vibration systems. A2-

Ability to find the components of a vibration system (stiffness, mass or diffraction moment, and damping). A3-

Ability to identify the type of motion of mechanical systems (oscillatory or non-oscillatory).

A4- Using the principles of mechanical vibrations such as Newton's second law, Lagrange's formula, and the conservation of mass

Energy in mathematical models to obtain equations of motion governing vibration systems.

A5- The ability to analyze vibrations of uncoupled and damped single-freedom systems.

A6- The ability to find the vibration response of single-freedom systems not coupled with damping that are subjected to

To protect the base and the back imbalance.

A7- Predicting the response of uncoupled and damped single-freedom systems subjected to periodic loads. **A8-**

Finding the response of uncoupled and damped single-freedom systems subjected to unloading

General.

B- The course's specific skill objectives

B1- Determine the natural frequencies and modes of the two- and multiple-freedom vibration systems. B2-

Ability to reduce the intensity of vibrations.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented.

The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for the titles

Chapters, definitions, charts, and several useful images, plus a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

- The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.
- The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Introduction: Basics of vibrations, importance of studying vibrations, and basic concepts.

Week 2: Classification of vibration: Classification according to freedom, classification according to nature, and classification according to type of input. Week 3: Free vibrations: Free vibrations of a system with one degree of freedom.

Week 4: Free vibrations: Free vibrations of uncoupled torsional systems.

Week 5: Free Vibrations: Free vibrations of viscously damped systems. Test 1 Week 6: Forced Vibrations: Equation of motion for an uncoupled system.

Week 7: Forced Oscillations: Equation of Motion for Coupled Systems. Midterm Exam

Week 8: Forced vibrations: Response of a coupled system under harmonic base motion. Week 9:

Forced vibrations: Response of a coupled system under gravitational disequilibrium.

Week 10: Oscillation under general stimulation conditions: Response under a general periodic function. Test 2

Week 11: Oscillation under general stimulation conditions: Response under a non-uniform periodic force. Week

12: Oscillation under general stimulation conditions: Response under a non-periodic force. Week 13 Report:

Multiple-velocity systems of freedom: Derivation of the equation of motion, and coefficients of influence.

Week 14: Systems of multiple degrees of freedom: Lagrange's equation.

Week 15: Systems of Multiple Freedom: The Subjective Value Problem. Test 3

Week 16: Preparation Week Before Final Exam

11- Infrastructure:

1- Required textbooks

2. Mechanics of Machines Elementary Theory and Examples, J. H. Hannah 1.

Theory of Vibration with Application, William T. Thomson. 2nd Edition

and R.C. Stephens. 4th Edition

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of vibration applications and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Power StationsCourse code: / ME416

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The overall objective of this course is to provide students with a comprehensive understanding of the operating principles of conventional and non-conventional power plants. The course covers the different types of power plants, performance analysis, and the basic principles of thermal cycles used in power plants.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Identify the general basics of power plants, including the basic principles of dynamics.

Thermal, fluid mechanics, and heat transfer.

A2- Understanding the operating principles of conventional power plants such as steam, gas, nuclear, and diesel power plants

As well as hydroelectric power stations.

A3- Describe the working principles of non-conventional power plants such as fuel cells, solar cells,

Bioenergy, geothermal energy, marine energy, wind energy, wave energy, and tidal energy.

A4-Performance analysis and evaluation of power plants using different thermal cycles.

B- The course's specific skill objectives

B1- Analysis and design of power cycles in conventional power plants.

B2- Evaluating the performance of gas and steam power plants based on different thermal cycles.

B3- Applying concepts and theories in analyzing non-conventional power plants and evaluating the effectiveness of each type.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: General Introduction to Power Plants - Review of basic thermodynamics, fluid mechanics, and heat transfer

Week 2: Definition of Power Plant Concepts - Classification of Power Plants

Week 3: Working principles of conventional power plants (steam, gas, nuclear, diesel, hydroelectric) Week 4: Working principles of non-conventional power plants (fuel cells, solar cells, bioenergy)

Week 5: Working principles of non-conventional power plants (geothermal energy, marine energy, wind energy, wave energy, tidal energy)

Week 6: Gas Turbine Power Plants: Types of Gas Cycles, Working Principles - Performance Analysis of Basic Cycle

Week 7: Basic cycle modifications for gas turbine power plants (reheating, recycling, multi-stage compression with cooling)

Week 8: Steam Turbine Power Plants: Steam Power Cycles (Carnot Cycle, Ideal Rankine Cycle, Actual Rankine Cycle)

Week 9: Analysis of the simple steam cycle - Modifications of the simple Rankine cycle

Week 10: Rankine cycle with superheating - Rankine cycle with reheating Week 11:

Rankine cycle with recirculation - Combined gas and steam power plants Week 12:

Comprehensive review of power plant concepts

Week 13: Power Plant Performance Analysis

Week 14: Practical Applications and Analysis

Models Week 15: Comprehensive Course Review

Week 16: Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Power plant engineering AKRaja, Amit Prakash, Manish Dwivedi.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of power plants and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Industrial Engineering / Course Code: ME417

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The Industrial Engineering course aims to provide students with a comprehensive understanding of the basic

concepts, techniques and methods in the field of industrial engineering. It focuses on decision-making theories,

operations research, optimization techniques, and control systems to improve the efficiency and effectiveness of industrial processes a

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understanding the basics of industrial engineering: Gaining knowledge about the basic and active principles and areas of focus.

In industrial engineering.

A2- Understanding decision-making theories: Learn different decision-making models, including game theory, and their applications in

Industrial environments.

A3- Understanding Operations Research: Understanding the role and trends of operations research and engineering economics.

A4- Mastering linear programming: Understanding the general form, assumptions, and methods of linear programming, including the

Simplex.

A5- Analysis of assignment and transfer problems: Learn mathematical formulas, algorithms, and methods for solving assignment prob

And transportation.

A6- Applying priority rules: Understanding different priority rules such as EDD, SPT, FCFS,

And.CR

A7- Explore the basics of control and maintenance engineering: Learn the basic concepts of inventory management, control,

Maintenance policies, including economic considerations.

A8-Performing Break-Even Analysis: Understand and apply graphical and mathematical techniques for

break-even analysis. **B- The course's specific skill objectives**

B1- Applying Decision Making Models: Using decision making theories to solve real-world industrial problems. B2- Implementing Linear Programming Solutions: Formulating and solving linear programming problems using the simplex method. B3- Solving Assignment and Transfer Problems: Using algorithms to solve assignment and transfer problems effectively. B4- Using Prioritization Rules: Applying prioritization rules to improve scheduling and production processes. B5- Inventory and Maintenance Management: Developing and implementing inventory and maintenance management policie

B6- Conduct break-even analysis: Perform and interpret break-even analysis to make financial decisions.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter.

The PPT presentations detail completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Introduction to Industrial Engineering - Basics, Activities, and Areas of Expertise.

Week 2: Decision Making Theories - Introduction.

Week 3: Decision Making Theories - Game Theory. Week

4: Operations Research - Introduction.

Week 5: Trends in Engineering Economics. Week 6:

Linear Programming - Introduction and General Format.

Week 7: Linear Programming - Assumptions, Applications, Advantages, and Disadvantages.

Week 8: Linear Programming - Formulation.

Week 9: Linear Programming - Simplex Method. Week 10:

Assignment Problem - Introduction and Algorithms.

Week 11: Assignment Problem - Unbalanced Assignment and Maximum

Assignment. Week 12: Transportation Problem - Introduction and Mathematical Formulation.

Week 13: Transportation Problem - Tabular Representation and Definitions.

Week 14: CR, EDD, SPT, FCFS Priority Setting Rules Week 15: Control

Fundamentals - Basic Concepts, Control Management and Maintenance

Week 16: Preparatory Week Before Final Exam

11- Infrastructure:

1- Required textbooks

1. Lectures for Industrial Engineering and Management

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of industrial engineering and using textbooks, scientific articles,

educational videos, and interactive programs. Including case studies and applied projects that link theory and practice

Practical in Engineering. Encourage discussions, teamwork, and active learning through workshops and hands-on activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding.

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Machine Parts Design II / Course Code: 421 ME

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (60) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The main objective is for the graduate mechanical engineer to be able to design the main components of machines and provide analyses of their stresses and strains.

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Understanding the types of gears and designing and analyzing contact forces. A2- Analysis and selection of contact bearings.

A3- Design and analysis of wall bearings.

A4- Design and analysis of the column and its loading from the viewpoints of bending, twisting and repeated stress. **A5-**Analysis of different connections (bolts and welds). **B- The course's specific skill objectives**

B1- Design and analysis of different belt transmission systems.

B2- Analysis of the basic principles of clutches, brakes and flexible couplings.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student’s ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1 Chapter 1: Introduction to Gear Design Basic information about the gear design process and stress calculations.

Week 2 Chapter 1: Introduction to gear design. Analysis of straight, helical and symmetrical gears.

Week 3 Chapter 1: Introduction to gear design. Gear selection, tooth number and module.

Week 4 Chapter 1: Introduction to gear design. Bending stresses in gears and introduction to Hertzian contact theory.

Week 5 Chapter 2: Introduction to bearing design. Types of bearings and their loads, stresses on inner and outer rings. Test.

Week 6 Chapter 2: Introduction to bearing design. Bearing load classification, dynamic load, and rating life. Bearing reliability and its relationship to expected life. Bearing selection and use of standards.

Week 7 Chapter 3: Introduction to the design of cylindrical bearings. Hydrodynamic and hydrostatic lubrication systems. Lubricant viscosity and other considerations.

Week 8 Chapter 3: Introduction to the design of spherical bearings. Design and dimensions of spherical bearings.

Week 9 Chapter 4: Introduction to Column Design. Types of columns and their supports, column materials, bending and torsion stresses on columns.

S Week 10 Chapter 4: Introduction to Column Design. Column design from the viewpoints of bending, torsion and repeated stress. Keys and grooves on columns. Test.

Week 11 Chapter 5: Introduction to belt conveyor systems. Flat belt analysis (open and crossed action systems). Tensions, packing angles, initial tension for maximum power transmission.

Week 12 Chapter 5: Introduction to conveyor belt systems. String beam analysis and selection.

Week 13 Chapter 6: Introduction to Welding and Stabilization. Types of Welded Joints. Analysis of Lifting and Tolerance Joints.

Week 14 Chapter 6: Introduction to Welding and Brazing. Analysis of joints with rough jacks and cover jacks.

Week 15 Chapter 7: Introduction to Computer-Aided Design (CAD/CAM) Introduction to Computer-Aided Design.

Week 16: Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Machine Design by RK Jain

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of machine parts design and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Measurements / Course Code: ME422

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

This course aims to cover the basic use and application of mechanical and electronic sensors, transformers, and measuring devices. It begins with establishing the theory of analog DC and AC measuring devices, and then this theory is used to study analog and digital electronic meters. The course also covers different types of sensors and transformers, in addition to the analog and digital interconnection of these devices. It also includes a study of the use and application of various measuring devices.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Describe the measuring instruments designed in terms of mathematical and

physical principles. A2- Understand how these instruments are used in measurements.

A3- Explain how converters integrate with analog and digital devices.

A4- Understand the role of software in achieving the desired results

of the measurement system. A5- Analyze how measurement tools are designed.

A6- Study how to measure different parameters using these tools.

A7- The ability to design measuring tools and electronic systems for multiple uses. **A8-** Understand the different applications of these tools in various fields. **B- The course's specific skill objectives**

B1- Use of various mechanical and electrical devices for field measurements: B2- Acquire practical skills in using mechanical and electrical measuring devices. B3- Apply these skills in real field environments.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

- Interaction within the lecture.
- Homework and reports.
- Short tests (quizzes)
- Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems.

D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

First week: Basics of measurement systems, measurement systems, signals, automatic measurements, specification terms.

Week 2: Types of instruments and characteristics of the

disease Week 3: Presentation, recording and presentation of measurement data

Week 4: Measurement errors, sources of error, random and systematic error, mean. Week

5: Measurement errors, value and error, error collection, aesthetic instrument error.

Week 6: Modeling measurement systems, elements of zero vibration, elements of first vibration. Week 7:

Modeling measurement systems, elements of second vibration, transfer function, frequency response.

Week 8: Sensors, classification of sensors, resistive sensors, capacitive sensors, piezoelectric sensors, optical sensors.

Week 9: Sensors, inductive sensors, electromagnetic sensors, thermal sensors, flexible sensors.

Week 10: Signal conditioning and processing, resistance to voltage conversion, operational amplifiers, noise, filters, modulation, analog and digital conversions, interconnection.

Week Eleven: Measurement by force, torque and pressure, measuring force, measuring torque, measuring pressure, measuring effort.

Week 12: Flow measurement Week 13:

Temperature measurement Week 14:

Strenght measurement

Week 15: Measurement of position and motion, measurement of linear displacement, measurement of angular displacement, measurement of velocity, accelerometers.

Week 16: Preparatory week before the final exam

Weekly lab syllabus

Week 1: Basics of measurement systems and types of

instruments Week 2: Lab 1: Measurement uncertainty Week

3: Lab 2: Calibration

Week 4: Lab 3: Display, record and present measurement data

Week 5: Lab 4: Measurement of mass, force and torque Week 6:

Lab 5: Measurement of mass, force and torque Week 7: Lab 6:

Measurement of temperature

Week 8: Lab 7: Temperature

Measurement Week 9: Lab 8: Pressure

Measurement Week 10: Lab 9: Flow

Measurement Week 11: Lab 10: Jihad

Scale Week 12: Lab 11: Jihad Scale

Week 13: Lab 12: Vibration and Shock

Measurement Week 14: Lab 13: Vibration and

Shock Measurement Week 15: Final Exam

11- Infrastructure:

1- Required textbooks

2. Fifth Edition Richard S. Figliola Clemson University

1. Theory and Design for Mechanical Measurements

3. Donald E. Beasley Clemson University

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of measurements and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Air Conditioning and RefrigerationCourse code: / ME423

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (45) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course "Air Conditioning and Refrigeration II" aims to provide students with an advanced understanding of air conditioning and refrigeration systems, including the design of different systems, advanced refrigeration techniques, and the principles of automatic control. The course focuses on modern refrigeration applications and systems to improve p

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Qualifying engineers to meet the needs of the labor market in the mechanical engineering sectors through diversification.

Learning, teaching and training methods.

A2- To know the outside air systems, return air systems, and mixed air systems with or without

Exceed, in addition to the unified systems.

A3-Learn piping design, basic system components, types of pumps, and pump selection.

Open and closed piping systems, design principles, and pressure loss in the system. **A4-**

Promote and develop scientific research in the fields of air conditioning and thermal performance of buildings.

B- The course's specific skill objectives

B1-Develop basic analytical skills using the first and second laws of thermodynamics.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Air conditioning systems: All outside air systems, return air systems, mixed air systems with or without bypass, unitary systems.

Week 2: Design of piping systems: piping network and basic components.

Week 3: Design of piping systems: Valves and expansion tanks, selection of pumps. Week 4: Design of piping systems: Open and closed system, direct and reverse circulation system. Week 5: Design of piping systems: Design method and pressure loss in the system.

Week 6: Refrigeration: Refrigeration applications, refrigeration methods, properties and types of refrigerants.

Week 7: Vapor-compression refrigeration systems: ideal cycle, second law of thermodynamics, Carnot refrigeration cycle.

Week 8: Vapor-compression refrigeration systems: Carnot heat pump, maximum performance efficiency. Week 9: Vapor-compression refrigeration systems: liquid refrigeration and vapor bypass, volumetric efficiency.

Week 10: Vapor compression refrigeration systems: Performance of basic components (condensers, evaporators, compressors, expansion devices, cooling towers).

Week 11: Absorption cooling systems: aqueous ammonia, lithium-bromide, electrolux systems.

Week 12: Evaporative cooling: evaporative tubes, thermoelectric cooling, simple air liquefaction.

Week 13: Air-Circuit Refrigeration: Closed System, Simple Open System, System Parameters.

Week 14: Cold Storage: Design of cold storage warehouses, doors and air curtains, types of coolers (gravity, side, direct expansion).

Week 15: Automatic Control: Refrigeration and Air Conditioning Control Systems, Three-Way Valves,

Thermostats Week 16: Preparatory Week Before Final Exam

11- Infrastructure:

1- Required textbooks

1. Jones, W.P., 2007. Air conditioning engineering. Routledge.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of air conditioning and refrigeration and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance unde

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Engineering Materials Failure / Course Code: ME424

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course "Failure of Engineering Materials" aims to study and understand the scientific and technical basis for the failure of materials under the influence of different loads. The course deals with the mechanical properties of materials, and the analysis methods for fractures, fatigue, creep, corrosion, and erosion. The course focuses on how to analyze these phenomena to ensure the integrity of the performance and reliability of materials in engineering applications.

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understanding the mechanical properties of materials: Recognizing the behavior of materials under stress, including elastic deform

Plastic, hardness and toughness properties.

A2- Understanding the principles of fractures: Study the basic principles of fractures, distinguish between plastic and brittle fractures, a

Principles of fracture mechanics and fracture testing.

A3- Understanding fatigue: Analyzing stresses, interpreting S–N curves, understanding how cracks initiate and propagate,

Factors affecting fatigue life.

A4- Understanding creep: Study of general creep behavior, effects of stress and temperature, and graphical estimation methods.

(Larsen-Miller methods), and alloys used in high temperature applications.

A5-Understanding Corrosion and Rust: Analysis of electrochemical considerations, types of corrosion, methods of corrosion prevention

Corrosion and rust.

B- The course's specific skill objectives

B1- Application of mechanical properties analysis: Ability to apply the concepts of deformation and stress and examine the properties of

Hardness and toughness of materials.

B2- Fracture analysis: Conducting and analyzing fracture tests, distinguishing between plastic and brittle fractures, and using

Principles of fracture mechanics.

B3- Fatigue Evaluation: Analysis and characterization of S–N curve, evaluation of fatigue effect factors, and estimation

of fatigue life of materials. B4- Application of creep techniques: Use of creep data estimation methods and their application to alloys used

High temperatures.

B5- Corrosion and Rust Management: Application of corrosion prevention techniques and analysis of electrochemical effects on materials

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Mechanical Properties: Elastic Deformation and Stress-Strain Behavior. Week 2: Mechanical Properties: Properties of Elastic and Plastic Materials, and Hardness. Week 3: Fractures: Basic principles of fractures, differentiation between plastic and brittle fractures. Week 4: Fractures: Principles of fracture mechanics, fracture testing and impact effects. Week 5: Fatigue: Analysis of stresses and S–N curve.

Week 6: Fatigue: Initiation and propagation of cracks, factors affecting fatigue life.

Week 7: Fatigue: Environmental effects on fatigue life.

Week 8: Creep: General creep behavior and effects of stress and temperature.

Week 9: Creep: Methods for estimating creep data (Larsen-Miller methods).

Week 10: Creep: Alloys used in high temperature applications. Week 11:

Corrosion and rust: Electrochemical considerations.

Week 12: Corrosion and Rust: Types of corrosion and methods of prevention.

Week 13: Corrosion and Rust: Corrosion and Rust - Definition and Types.

Week 14: Corrosion and Rust: Corrosion and Rust Analysis and Application of Prevention Strategies.

Week 15: Comprehensive Review: Review of all main topics, case studies and practical applications. Week

16: Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Jones, W.P., 2007. Air conditioning engineering. Routledge.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of engineering materials failure and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Vibration Applications/Course Code: ME425

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

After completing this program, students will be able to use laboratory equipment correctly to obtain the best results, and be able to measure the vibration characteristics of mechanical systems and interpret the results. They will also be able to analyze and formulate mathematical problems for realistic mechanical vibration problems, as well as calculate the natural frequencies and modes of transverse vibrations of pegs and strings. They will be skilled in measuring and controlling vibrations and noise.

9. Course outcomes, teaching, learning and assessment methods A- Cognitive objectives

A1- Applying the basic principles gained from understanding the theory of vibrations.

A2- Acquiring skills in dealing with engineering problems and issues related to vibrations. **A3-** Gain a basic understanding of how vibrations occur in various industrial applications. **B- The course's specific skill objectives**

B1- Ability to perform vibration analysis of the stake (string).

B2- The ability to analyze and process vibrations in the column (shape). B3-

The ability to reduce the intensity of vibrations.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the

display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems.

D6-Enhancing the ability to communicate effectively and present mathematical solutions in a clear and convincing manner. D7-Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1-4: Determination of natural frequency and mode shapes, Dunkerley formula, Holzer method, and Rayleigh method. Week 5: Continuous systems, introduction, and vibration of a rope. Quiz 1

Week 6: Continuous systems, longitudinal vibrations of the stick.

Week 7-8: Continuous systems, helical vibrations of shafts and shafts. Midterm exam Week 9: Control of vibrations, balancing of moving machines.

Week 10: Vibration control, axle rotation.

Week 11: Vibration control, vibration isolation. Quiz 2 Week 12: Vibration control, natural frequencies control.

S Week 13: Vibration measurements, vibration sensors. S Week 14: Vibration measurements, vibration exciters.

Week 15: Vibration measurements, signal analysis and short exam

Week 3: 16: Preparatory week before the final exam

Weekly conscious lab curriculum

Week 1: Lab 1: General introduction to the lab.

Week 2-3: Lab 2: One degree of freedom system (pendulum spring). Week 4-5: Lab 3: One degree of freedom system (mass and spring system).

Week 6-7: Lab 4: Helical vibration systems.

Week 8-9: Lab 5: Forced vibration systems.

Week 10-12: Lab 6: Two-degree-of-freedom screw vibration

system. Week 13-15: Lab 7: Axial rotation

11- Infrastructure:

1- Required textbooks

2. Mechanics of Machines Elementary Theory and Examples, J. H. Hannah 1. Theory of Vibration with Application, William T. Thomson. 2nd Edition

and R.C. Stephens. 4th Edition

3. Kelly, S. Graham, "Mechanical Vibrations: Theory and Applications", SI Edition, Cengage Learning, 2011.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and techniques in the field of vibration theory and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical applications in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the cours

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Power StationsCourse code: / ME426

4. Available forms of attendance: in-person attendance

5. Chapter / Year First Semester / Fourth Stage

6. Total number of vertical hours (90) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The course "Power Plants II" aims to study and analyze the components and performance of thermal power plants,

including boilers, condensers, steam turbines, as well as hydropower plants. The course focuses on understanding

the basic principles of operation and optimization of the performance of these systems, in addition to the economic aspects of power p

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understanding the components of steam power plants: Identifying the types of boilers, condensers and steam turbines.

And its uses.

A2- Performance analysis of power plant components: Study how to calculate and analyze the performance of boilers, condensers,

And turbines.

A3- Understanding Hydropower Plants: Classification of Hydropower Plants, Uses of Hydro Turbines, and Understanding

Hydropower calculations.

A4-Economic analysis: Identify the economic foundations of power plants and estimate costs and returns.

B- The course's specific skill objectives

B1- Application of boiler concepts: Ability to classify boilers, understand their operating principles, and perform calculations.

Boiler performance.

B2- Capacitor Analysis: Evaluate the performance of capacitors, and understand the design and operation of the different components in a c

B3- Turbine Design: Understanding and designing steam turbines, including speed chart analysis and design.

Example of turbine blades.

B4- Hydropower calculations: Ability to perform hydropower calculations and analyze the advantages and disadvantages of hydropower sta

Hydropower.

B5-Economic feasibility analysis: evaluating the economic aspects of energy projects and estimating costs and benefits

Economic.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogic style, and the active method. Scientific and research skills are developed through teaching and learning activities. Analysis and problem-solving skills are developed further by a set of problems prepared by the lecturers through small study groups and evaluation and response to all the work presented. The course objectives will be conveyed through a variety of educational methods. PowerPoint presentations will be provided for chapter titles, definitions, charts, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

H-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method for the topic and according to the teaching curriculum for the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for theoretical and practical aspects.

• Final exams for the theoretical and practical aspects.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student's ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student's ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: Components of steam power plants (boilers): Classification of steam generators.

Week 2: Components of Steam Power Plants (Boilers): Boiler coils, equipment and requirements of a good boiler.

Week 3: Components of steam power plants (boilers): Principle of operation of fire boilers, tubes and heat recovery.

Week 4: Components of steam power plants (boilers): Boiler performance calculations.

Week 5: Components of Steam Power Plants (Condensers): Types of condensers and elements of a steam condenser. Week 6: Components of Steam Power Plants (Condensers): Air ejectors and requirements for an efficient condenser. Week 7: Components of Steam Power Plants (Condensers): Analysis of condenser performance.

Week 8: Components of Steam Power Plants (Steam Turbines): Speed diagrams for steam turbines.

Week 9: Components of steam power plants (steam turbines): Steam turbines are combined in terms of pressure and speed.

Week 10: Components of steam power plants (steam turbines): Axial flow steam turbines, optimum operating conditions.

Week 11: Components of Steam Power Plants (Steam Turbines): Design and Height of Turbine Blades. Week 12: Hydro Power Plants: Classification of Hydro Power Plants.

Week 13: Hydropower Plants: Types of Hydropower Turbines and Advantages and Disadvantages of Hydropower Plants. Week 14: Hydropower Plants: Hydropower Calculations.

Week 15: Economic feasibility of power plants: Economic basis of power plants and estimation of costs and benefits.

Week 16: Preparatory week before the final exam

Weekly lab curriculum

Week 1 & 2: Components of Power Plants.

Week 3 & 4: Power Plant Efficiency Evaluation and Simulation Using EES Software. Week 5 & 6: Steam Turbine Efficiency Evaluation and Simulation Using EES Software. Week 7 & 8: Gas Turbine Efficiency Evaluation and Simulation Using EES Software. Week 9: Exam.

Week 10: Nozzles.

Week 11: Condenser efficiency evaluation and simulation using EES software. Week 12: Boiler efficiency evaluation and simulation using EES software. Week 13: Review.

Week 14: Final Exam.

Week 15: Final Exam.

11- Infrastructure:

1- Required textbooks

1. Power plant engineering AKRaja, Amit Prakash, Manish Dwivedi.

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library

websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Adding the latest research and technologies in the field of power plants and using textbooks, scientific articles, educational videos, and interactive programs. Including case studies and applied projects that link theory and practical application in engineering. Encouraging discussions, group work, and active learning through workshops and practical activities. Providing resources such as educational videos, e-books, and interactive software tools to enhance understanding

Course Description

The model description provides a concise description of the main features of the course and the expected

learning outcomes that the typical student will achieve if he or she takes advantage of the learning opportunities available in the course. It sl

1. Educational Institution: University of Maysan

2. Scientific Department/Center: Department of Mechanical Engineering

3. Course Name/Code: Project Management / Course Code: ME427

4. Available forms of attendance: in-person attendance

5. Chapter/Year Second Semester/Fourth Stage

6. Total number of vertical hours (30) hours.

7. Date of preparation of this description: July 2024

8.**Course objectives:**

The Project Management course aims to provide students with the basic knowledge and skills in project

management, starting from planning and organizing to controlling budgets and managing risks. The course

focuses on developing a comprehensive understanding of project management fundamentals and how to apply specific tools and tech

9. Course outcomes, teaching, learning and

assessment methods A- Cognitive objectives

A1- Understanding the basics of project management: Identifying the concept of project management, its objectives, and the importan

The contexts.

A2- Project Planning: Understand how to use the Work Breakdown Structure (WBS) and Gantt charts in project planning.

The project.

A3- Activity Network Analysis: Learn how to estimate project duration using activity networks and analysis.

Critical Path (CPM) and PERT Analysis.

A4- Resource Analysis: Understand how to analyze resource use using information from the activity network and structure.

Division of labor.

A5- Budgets and Cost Control: Learn to estimate project costs, prepare budgets and analyze benefits.

And costs.

A6- Net Present Value (NPV): Understand how to apply net present value in cost-benefit analysis. A7- Risk Management: Understand the concept of risk in software/systems projects and learn risk management techniques. **A8-**Project Teams: Understanding Team Dynamics, Motivation, and Identifying Rotations. **B- The course's specific skill objectives**

B1- Application of project planning tools: Ability to use work breakdown structures and Gantt charts to plan projects effectively.

B2- Activity Network Analysis: Ability to estimate project duration, critical path analysis and apply analysis.

PERT.

B3- Resource management: Analyzing and planning resource use based on available information.

B4- Preparing budgets and controlling costs: making accurate cost estimates, preparing budgets, and analyzing Benefits and costs.

B5- Applying Net Present Value (NPV) analysis: Using NPV in project evaluation and decision making Finance.

B6- Risk Management: Applying risk management techniques and analyzing specific risks in projects.

B7- Project team management: improving team dynamics, motivating members, and distributing roles effectively.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive educational programs and roulette.

Improving and expanding critical thinking skills at the same time by thinking about the type of simple physical representation (primary models) that include some activities that interest students. Raising the scientific and cognitive levels of students by employing technology, the dialogical method, and the active method. Scientific and research skills are developed from

During the teaching and learning activities. Analytical and problem-solving skills are further developed by a set of problems prepared by the lecturers in small study groups and assessment and response to all the work presented. The course objectives will be conveyed through a variety of teaching methods. PowerPoint presentations will be provided with chapter titles, definitions, diagrams, and several useful pictures, in addition to a summary at the end of each chapter. PPT presentations provide details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for the students to review.

Evaluation methods

• Interaction within the lecture.

• Homework and reports.

• Short tests (quizzes)

• Midterm and final exams.

C-**Emotional and value goals**.

A1- Attention: Arousing the students' attention by implementing one of the application programs on the display screen in the hall. A2- The response: Monitoring the extent of the student's interaction with the material displayed on the screen.

A3- Interest: Following up on the interest of the student who interacted more with the presented material, by increasing this interaction by requesting other programs and applications to display it.

A4- Forming the attitude: meaning that the student is sympathetic to the presentation and may have an opinion regarding the presented topic and defend it.

A5- Forming value-based behavior: meaning that the student reaches the top of the emotional ladder, so that he has a stable level of morality and does not become lazy or restless.

Teaching and learning methods

• The usual theoretical presentation method using the whiteboard and relying on the (how and why) method.

According to the subject and the curriculum of the subject.

• The theoretical presentation method is done using the (show data) device and depending on the (how and why) method for the topic and according to the teaching curriculum for the subject.

Evaluation methods

• Direct questioning in the manner of (how and why) regarding the topic during the theoretical lecture.

• Surprise exams during the theoretical lecture.

• Semester exams for the theoretical part.

• Final exams for the theoretical part.

D-**General and transferable skills (other skills related to employability and personal development)** D1- Developing the student’s ability to perform assignments and submit them on time. D2- Logical and programming thinking to find programming solutions to various problems. D3- Developing the student’s ability to dialogue and discuss.

D4-Developing the student's ability to deal with modern technology, especially the Internet. D5- Developing teamwork and cooperation skills in solving mathematical and engineering problems. D6- Enhancing the ability to communicate effectively and provide mathematical solutions in a clear and convincing manner. D7- Acquiring time management and project management skills while working on complex engineering problems. **10. Course Structure**

Week 1: What is Project Management: Introduction to the concept of project management.

Week 2: Project Planning: Introduction to project planning, use of the Work Breakdown Structure (WBS) and the role of Gantt charts.

Week 3: Project Planning: Continue studying the Work Breakdown Structure (WBS) and Gantt charts.

Week 4: Activity Network Analysis: Use activity networks to estimate project duration. Week 5: Activity Network Analysis: Use Critical Path Model (CPM) and PERT analysis.

Week 6: Resource Analysis: Analyze resource use using information from the activity network and work breakdown structure.

Week 7: Resource Analysis: Continue to analyze and plan resource use.

Week 8: Budgets and Cost Control: Estimating project costs and preparing budgets. Week 9: Budgets and Cost Control: Cost-benefit analysis.

Week 10: Net Present Value (NPV): Applying NPV in cost-benefit analysis. Week 11: Risk Management: Introduction to risk management in software/systems projects.

Week 12: Risk Management: Risk management techniques and examining specific risks. Week 13: Project Teams: Team Dynamics and Motivation.

Week 14: Project Teams: Team roles and managing relationships between team members.

Week 15: Comprehensive Review: Review of all major topics, case studies and practical applications. Week 16: Preparatory week before the final exam

11- Infrastructure:

1- Required textbooks

1. Lectures for Industrial Engineering and Management

2- Main references (sources)

A- Recommended books and references (scientific journals, reports, etc., reliable websites, library websites in some international universities.

B - Electronic references, websites

12. Curriculum Development Plan

Add the latest research and techniques in the field of project management and use textbooks, scientific articles, educational videos, and interactive programs. Include case studies and applied projects that link theory and practical application in engineering. Encourage discussions, group work, and active learning through workshops and practical activities. Provide resources such as educational videos, e-books, and interactive software tools to enhance understanding