Description of the academic program with its courses Date of update: February2025

Program DescriptionAcademic

A brief summary of the main features of the program and its courses, indicating the skills that are being worked on to provide students with, based on the objectives of the academic program and according to the learning outcomes expected of the student, proving whether he has achievednoMake the most of the opportunities available. It is accompanied by a description of each course within the program..

University of Maysan	1. **Educational institution**
Department of Mechanical Engineering	2. **Scientific Department/Center**
Mechanical Engineering Department Curricula for all levels	3. **Program namenoAcademic or professional**
Bachelor of Mechanical Engineering	4. **Final Certificate Name**
quarterly	5. **Academic system**
ABET	6. **Accredited Certification Program**
Field and scientific visits	7. **Other external influences**
February2025	8. **Description preparation date**

9. **GoalsThe programAcademic**

1- PreparationEngineers MechanicsHighly educated, qualified and distinguished to supportPublic and private labor marketsAnd cover its needs of cadresEngineering And train themTo apply acquired knowledge and skills to solve real-world problems..

2- Providing distinguished academic programs in the field of engineering.MechanicsIn its theoretical and practical aspects, in line with international quality standards.unlessAcademic and meets the needs of the labor market.

3- Moving towards e-learning and blended learningand encourage self-education.

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

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

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

7- Keeping pace with scientific developments in the field ofMechanical Engineering.

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

9- Establishing and strengthening effective partnerships with governmental and civil sectors and all community institutions.

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

أ- Anocognitive scorer

أ1- Know and understand the basicsmechanical engineering

أ2- The ability to apply knowledge in mathematics, science, and engineering.

أ3- Developing students' mental abilities by expanding their cognitive horizons in all disciplines.mechanical engineering.

أ4- Develop the ability toDetermine andProblem analysisEngineering.

أ5- Application of theoretical concepts, rules and lawsEngineering andUse of techniques and skillsnoModern toolsFor the crisisTo practice engineering.

أ6- Ability to understand the applicable regulations and professional standards of the profession.

ب- Program Skill Objectives

B1- Ability to detect and solve problems in modern ways

B2- Ability to supervise or execute various mechanical engineering works efficiently..

B3- Use real-life examples and match 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- TOld explanation and clarification through lecturesAnd discussions.

2- Use of projectors to present scientific materials, such as data shows, smart boards, and plasma screens.

3- Promote self-learning through homework and mini-projects integrated into lectures.

4- E-learning within the university.

5- Conducting experiments and training in laboratoriesAnd preparing reports for experiments.

6- Completion of graduation projects as comprehensive field learning projects..

7- Organizing scientific visits to enrich practical experiences.

8- Holding seminars within the department.

9- Implementation of summer training programs.

10- Engineering workshops

Evaluation methods

1- Daily exams.
2- Midterm exams.
3- Reports and mini projects within the lesson.
4- DiscussionsAnd interaction within the lecture.
5- Surprise written and oral tests.
6- Ask questions during lectures and mark students..
7- Homework.
8- Final exams.

ج- theAEmotional and value scorer

C-1 AnoAttention: To attract students' attentionNoAnoQuestions during the lecture.

C-2AnoAnswer: Monitor the student's interaction with the material displayed on the screen..

C-3AnoAttention: Follow up on the interest of the student who interacted the most with the presented material..

C-4 Forming the attitude: meaning that the student should be sympathetic.He is with the show and may have an opinion on the subject.

Displayed and defended.

C-5 Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder and has a stable level in

The lesson is not lazy or fidgety.

Evaluation methods

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

2- unlessCommitment to the deadline for submitting assignments and research required of the student.

3- TaforR ANoQuarterly and final exams aboutNoCommitment to cognitive and skill achievement.

٥- 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 multiple 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 study materials, curricula and approved teaching methods.

2- Encouraging students to work in teams on practical projects that reflect the reality of society and address its problems..

3- Motivating students to participate in competitions, seminars and conferences to enhance their research skills and increase their confidence in their ability to learn independently.

12. Admission Criteria (Setting regulations for admission to a 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 preparatory studies (scientific branch) are nominated for admission to the department based on their graduation rates. In addition, students are accepted into 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 vocational studies, and some distinguished employees from state ministries.

13. The most important sources of information about the program

1. Websites of Iraqi and international 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. structure The program:Includes program Bachelor Engineering Mechanical Courses Next:

Number of hours					Name of the course	The symbol	Stage	No.
exercises	Pr (hr/w)	laboratory	theoretical	college				
1			3	4	Engineering Analysis	E311	Third/First Semester	1
1			3	4	Heat transferI	ME312		2
1		3	2	6	Machine theory	ME313		3
1		3	2	6	internal combustion enginesI	ME314		4
1			2	3	Gas dynamics	ME315		5
1			2	3	Electrical machines I	ME316		6
	3		2	5	Manufacturing processesI	ME317		7
1		2	2	5	Numerical analysis	E321	Third/Second Semester	1
1		3	2	6	Heat transferII	ME322		2
1			2	3	Machine theory	ME323		3
1			2	3	internal combustion enginesII	ME324		4
1		3	2	6	Turbine machines	ME325		5
1	2		2	5	Electrical machinesII	ME326		6
			2	2	Manufacturing processesII	ME327		7
1		3	3	7	Machine parts designI	ME411	Fourth / First Semester	1
1			2	3	Control	ME412		2
1	3		2	6	Air conditioning and refrigerationI	ME413		3
			2	2	Engineering materials	ME414		4
1			2	3	Theoretical vibrations	ME415		5
1			2	3	Power stations I	ME416		6
			2	2	Industrial Engineering	ME417		7
	3		2	5	Engineering project	ME418		8

1			3	4	Machine parts designII	ME421	Fourth / Second Semester	1
1		3	2	6	Measurements	ME422		2
1			2	3	Air conditioning and refrigerationII	ME423		3
			2	2	Engineering materials failure	ME424		4
1	3		2	6	Vibration applications	ME425		5
1		3	2	6	Power stationsII	ME426		6
			2	2	Project management	ME427		7
	3			3	Engineering project	ME429		8

Curriculum Skills Chart

Please tick the boxes corresponding to the individual learning outcomes of the programme being assessed.Required learning outcomes of the program Year/Level Course code Course name Basic Or my choice?noCognitive goal scornoProgram Skills Top ScornoConsciousness scorer Values of general and transferable qualification skills(Skills ANoEmployability and development issuesPersonalAs in Table 1

table 1. Outputs Learning Required from all Scheduled Therefore from The program Academic

Required learning outcomes of the program						
General skills And rehabilitationMovable(Skills ANoirrigationRelated to employability and personal development)	Emotional and value goals	Program specific skill objectives	Cognitive objectives	Course Type	The material	Stage
D1 D2 D3 D4	Part 1 Part 2 Part 3 Part 4 Part 5	B1 B2 B3 B4	A1 A2 A3 A4			

Description of the academic program with its courses Date of update: February2025

✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Engineering analysis	Third
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Heat transfer	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Machine theory	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	internal combustion engines	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Gas dynamics	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	Support	Electrical machines	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	essential	Manufacturing processes	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Numerical analysis	

Description of the academic program with its courses Date of update: February2025

✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Heat transfer II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Machine theory	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	internal combustion engines II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Turbine machines	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	Support	Electrical machines II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	essential	Manufacturing processes II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Machine parts design I	Fourth
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	conditioning And cooling Air I	

Description of the academic program with its courses Date of update: February2025

✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Power stations I	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	vibration theory	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	control	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Engineering materials	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Industrial Engineering	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Engineering project	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Machine parts design II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	conditioning And cooling Air II	

Description of the academic program with its courses Date of update: February2025

✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Vibration applications	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Power stations II	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Measurements	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	Support	Project management	
✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓	My specialty	Engineering project	

Description of the academic program with its courses Date of update:

Course Description

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapter AFirst/StageThird**
6. **Total number of study hours (60) hour**
7. **Date this description was preparedFebruary 2025**
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 periodic functions and the solution of engineering problems with periodic phenomena. The course includes a study of the properties and applications of odd and even functions, as well as half-range series to approximate these 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 and legendary 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, students will gain an understanding of statistics and probability and their application in engineering contexts.

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

أ- Cognitive objectives

أ1- Analyze and solve engineering problems using complex variable techniques, including complex integration and equivalence imaging.

أ2- Understand and apply special functions such as the gamma function to effectively solve mathematical and engineering problems.

أ3- Analyze and solve engineering problems using Fourier series, with an understanding of the representation of periodic functions, their properties, and their applications in engineering.

أ4- Apply the concepts of odd and even functions and half-range series to approximate and analyze geometry problems involving odd functions.

أ5- Use complex Fourier series and half-range expansion to analyze and approximate complex periodic functions encountered in geometry.

أ6- Use Laplacian transformation techniques to solve ordinary differential equations, including initial value problems, and interpret results in engineering contexts.

ب- Course specific skill objectives

ب1- Analyze and solve engineering problems involving partial differential equations, understand their classifications, and choose appropriate solution techniques.

ب2- Apply solutions of partial wave equations to analyze and model wave phenomena in engineering systems.

ب3- Apply solutions of partial heat equations 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 tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Description of the academic program with its courses Date of update:

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Description of the academic program with its courses Date of update:

Week 1 Chapter 1: Variables and Composite Functions,For complex functions, continuity and differentiation, Cauchy-Riemann equations, and complex integrals..

Week 2 Chapter 1: Variables and Composite Functions,Composite functions, gamma function.

Week 3 Chapter 1: Variables and Composite Functions,Integration on paths, equivalence imaging.,a testshort

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-range expansion.

Week 6 Chapter 2: Fourier Series and Integration,instant integration. a testshort

Week 7 Chapter 3: Laplace Transform,Laplace transform, Laplace transform of derivatives and integrals.

Week 8 Chapter 3: Laplace Transform,Laplace transform of special functions, inverse Laplace transform.Short test

Week 9 Chapter 4: Solving Ordinary Differential Equations,Ordinary Differential Equations, Solving Ordinary Differential Equations Using Laplace Transform.

Week 10 Chapter 4: Solving Ordinary Differential Equations,Solving Ordinary Differential Equations Using the OperatorD.

Week 11 Chapter 4: Solving Ordinary Differential Equations,Bessel functions and Legender functions. a testshort

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, probabilities and distribution.

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Advanced Engineering Mathematics, 10th edition by Kreyszig, E. Wiley 1. 2011

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

Description of the academic program with its courses Date of update:

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldEngineering AnalysisUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Heat transferI /Course code: ME312**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (60) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This course aims to:Learn heat transfer methods.andStudy of heat transfer laws and their calculations.like thatDevelop an understanding of heat load

calculations in heat transfer systems..andIdentify the relationships that have been studied..andStudy of heat transfer applications. Identify the most important design parameters for heat transfer applications and systems.

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

أ- Cognitive objectives

أ1- Introducing heat transfer methods.

أ2- Learn how heat is transferred.

أ3- Identify heat transfer by thermal conduction in the steady state of surface bodies.

أ4- To learn about heat transfer by thermal conduction in the steady state of circular bodies.

أ5- Definition of overall heat transfer coefficient.

أ6- Description of heat source systems.

أ7- Discussion and analysis of extended surfaces.

أ8- Definition of thermal contact resistance.

أ9- Discussion of the system of combined heat capacity.

أ10- Explain the transient heat flow in semi-infinite steel.

أ11- Identify the physical mechanisms and properties of radiation.

أ12- Definition of radiation form factor.

أ13- Identify heat exchange between non-black bodies and infinite parallel surfaces.

أ14- Explain radiation shields, solar radiation, and the effect of radiation on temperature measurement.

ب- Course specific skill objectives

ب1- Apply heat transfer techniques to solve specific engineering problems.

ب2- Analysis and calculation of heat transfer laws and their practical application.

ب3- Use of heat load calculations for heat transfer systems.

ب4- Identify relationships related to heat transfer.

ب5- Study of heat transfer applications in various engineering fields.

ب6- Identify the most important design parameters for heat transfer applications and systems.

ب7- Analyze and discuss expanded surfaces in detail.

ب8- Effectively estimate and define thermal contact resistance.

ب9- Application of the combined heat capacity system in heat transfer calculations.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety

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Evaluation methods

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

ج- **AnoEmotional and value scorer**.

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ج3-Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

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د2- Logical and programming thinkingTo findSoftware solutions for various problems.

د3- Developing the student's ability to dialogue and discuss.

ر4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

ر5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

ر6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

ر7- Gain 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 conductivity

Week 3 Chapter 2: Steady-state conduction,flat wall

Week 4 Chapter 2: Steady-state conduction,Radiation systems

Week 5 Chapter 2: Steady-state conduction,Overall heat transfer coefficient,Critical thickness of insulation,a testshort

Week 6 Chapter 2: Steady-state conduction,Heat source systems

Week 7 Chapter 2: Steady-state conduction,Extended surfaces

Week 8 Chapter 2: Steady-state conduction,Extended surfaces,Thermal contact resistance

Week 9 Chapter 3: Conduction in the Unsteady State,introduction,Combined heat capacity system

Week 10 Chapter 3: Conduction in the Unsteady State,Transitional heat flow in semi-infinite steel,a test

Week 11 Chapter 3: Conduction in the Unsteady State,Load limit conditions

Week 12 Chapter 4: Introduction to Radiation,Physical mechanism,Radiation properties

Week 13 Chapter 4: Introduction to Radiation,radiation form factor

Week 14 Chapter 4: Introduction to Radiation,Heat exchange between non-black bodies,infinite parallel surfaces

Week 15 Chapter 4: Introduction to Radiation,Radiation shields and solar radiation,Effect of radiation on temperature measurement

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Fundamentals of Heat and Mass Transfer, Theodore L. Bergman, 1. Adrienne S. Lavine, Frank P. Incropera, David P. Dewitt, Seventh Edition, 2011.

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific T,Reports...., sitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic,SitesunlessInternet

Description of the academic program with its courses Date of update:

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldHeat transferUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achievedThe model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Machine theoryCourse code: ME 313**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (90) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This course aims to:Learn linear velocities, angles and acceleration. Cam and follower motions and design. Gear terminology and contact stresses. Role and design of flywheels.

Description of the academic program with its courses Date of update:

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

أ- Cognitive objectives

أ1- Understand velocity and acceleration graphs, including linear and angular motions.

أ2- Learn how to calculate the velocity of points on a rolling body.

أ3- Learn about linear acceleration and angles.

أ4- Understand the concept of equivalent bonds and the Corius component.

أ5- Learn about words, followers and their different types.

أ6- Learn how to create displacement graphs, motion types, and build cam profiles.

أ7- Learn the basic terms of gears, their requirements and classifications.

أ8- Understand the terms, definitions, and analysis procedures for geared wheels.

أ9- Know the contact ratios and number of teeth in gears.

أ10- Understanding gear trains.

أ11- Know the masses used in aviation wheels and their applications in internal combustion engines.

أ12- Learn about transactionsTMD and related links.

أ13- Identify machine design problems.

ب- Course specific skill objectives

ب1- Apply velocity and acceleration graphs to calculate linear and angular velocities and accelerations.

ب2- Analyze and interpret motions on a rolling body and use equivalent connections.

ب3- Create displacement graphs and design different cam profiles.

ب4- Analyze gear requirements, classify them, understand contact ratios and tooth counts.

ب5- Application of analysis procedures to the design of gear trains.

ب6- Calculation of masses used in aviation wheels and their application in the design of internal combustion engines.

ب7- Solve machine design problems and analyze the related links.TMD.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1-Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2-Response: Monitoring the student's interaction with the material displayed on the screen.

ج3-Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4-formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5-Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

Description of the academic program with its courses Date of update:

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 Accelerations and Angular Velocities.

Week 4 Chapter 2: Introduction to Velocity and Acceleration Graphs,Equivalent Link and Correos Component.

Week 5 Chapter 3: Introduction to Words and Followers,introduction.,Types of words and followers. a test.

Week 6 Chapter 3: Words and Followers,displacement graphs. TypesMovements.CreateandCam profile.

Week 7 Chapter 3: Words and Followers,Create a cam profile. Week 8 Chapter 4: Introduction to Gears,Introduction and basic terms of gears. Gear Requirements and Classifications.

Week 9 Chapter 4: Introduction to Gears,Terms, Definitions and Analysis Procedures. Contact ratio and number of teeth.

Week 10 Chapter 4: Introduction to Gears,gear trains.

Week 11 Chapter 5: Flying Wheels,introduction. Flywheel block.

Week 12 Chapter 5: Flying Wheels,Flywheels in internal combustion engines.

a test.

Week 13 Chapter 5: Flying Wheels,TransactionsTMD 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 lab schedule

Week 1 Lab 1: Speed of the sliding crank mechanism.

Week 2 Lab 2: Velocity of Four- and Five-Part Mechanisms.

Week 3 Lab 3: Acceleration of a sliding crank mechanism.

Week 4 Lab 4: Acceleration of Four and Five-Part Mechanisms.

Week 5 Lab 5: Simple Harmonic Cams(SHM).

Week 6 Lab 6: Uniform acceleration and deceleration cams(UAR).

Week 7 Lab 7: Cam Profiles forSHM and UAR.

Week 8 Lab 8: Cam Profiles forUAR.

Week 9 Lab 9: Gears and Sprockets.

Week 10 Lab 10: Gear Classification.

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-AInfrastructure:

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(The fieldAScientific T,Reports...., sitesNoElectronic Sober.

Library locations in some international universities.

B - ReferencesNoElectronic,SitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldMachine theoryUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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

Description of the academic program with its courses Date of update:

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:internal combustion engines I /Course code: ME314**
4. **Available forms of attendance: in-person or online**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (90) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This course aims to teach the basics of internal combustion engines, analyze standard air-to-air cycles, 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 assessment methods**

أ- Cognitive objectives

أ1- Gain knowledge about internal combustion engines.

أ2- Understand the differences between types of internal combustion engines.

أ3- Use standard air cycle analysis to calculate the thermal characteristics of engines.

أ4- Study of the systems used to support the operation of the engine.

أ5- Gain knowledge about the performance of the Wankel engine.

ب- Course specific skill objectives

ب1- Calculate engine operating parameters.

ب2- Discuss the differences between a Wankel engine and a reciprocating engine.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1-Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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ج4-formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5-Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

Description of the academic program with its courses Date of update:

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Description of the academic program with its courses Date of update:

Week 1:Chapter 1: Basic Engine Types and Operation. Introduction to the reciprocating engine and basic engine terminology..

Week 2:Chapter One: Basic Engine Types and Their Operation. Spark Ignition Engine.

Week 3:Chapter One: Basic Engine Types and Their Operation. Spark Ignition Engine.

Week 4:Chapter One: Basic Types of Engines and Their Operation. Rotary Engines.

Week 5:Chapter 2: Engine Power and Performance. Basic Measurements of Power and Effective Average Specific 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. Air cycle approximation and importance of thermal efficiency. Theoretical cycles and air cycle 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 the Fuel-Air Cycle and the Scope of the Fuel-Air Cycle.

Description of the academic program with its courses Date of update:

Week 11:Chapter 3: Thermodynamics of Internal Combustion Engines. Actual Engine Cycle.

Week 12:Chapter 4: Supercharged Engines and Their Performance. Definitions and Reasons for Supercharging.

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 Five: Wankel Engine. Comparison between Wankel engine and reciprocating engine and performance of Wankel engine.

Week 16 Preparatory week before the final exam

Weekly lab schedule

Week 1 and 2 Lab 1: Spark Ignition Engine Operation(SI).

Week 3 and 4 Lab 2: Compression Ignition Engine Operation(CI).

Week 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 and 12 Lab 6: Engine Exhaust Analysis.

Week 13 Lab 13: Review.

Week 14 Lab 14: Exam.

Week 15 Lab 15: Final Exam.

11-AInfrastructure:

1- Required Textbooks

Engineering Fundamentals of the Internal Combustion Engine. 1.

Willard W. Pulkrabek. University of Wisconsin

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific T,Reports...., sitesNoElectronic Sober.

Library locations in some international universities.

B - ReferencesNoElectronic,SitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldinternal combustion enginesUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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

Description of the academic program with its courses Date of update:

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Gas dynamicsCourse code: ME315**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (45) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This course aims to:toDerivation of the main and fundamental equations governing compressible flow at different velocities and flow conditions starting from the basics of thermodynamics and fluids, differentiating compressible flow into four different flow states according to its velocity, applying compressible flow conditions to channels with variable areas using ideal flow conditions (isentropic flow), considering the effect of normal shock wave on ideal compressible flow in a channel with variable area, considering the effect of friction on ideal compressible flow in a channel with constant area (Vanua channel), considering the effect of heat addition or absorption on ideal compressible flow in a channel with constant area (Rayleigh channel), analyzing the thrust and propulsive efficiency of turbojet, turbofan and turbopropeller engines..

Description of the academic program with its courses Date of update:

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Understand the basic equations governing compressible flow under specified conditions.

أ2- Distinguish between different states and conditions of compressible flow.

أ3- Determine the compressible flow characteristics in ideal flow condition using ideal flow conditions (isentropic flow) in a channel with variable area.

أ4- Determine the properties of compressible flow when subjected to a normal shock wave in a channel of variable area.

أ5- Determine the characteristics of compressible flow under different flow conditions considering the effect of friction and heat transfer in a channel of constant area.

أ6- Calculating the thrust efficiency of turbojet engines.

ب- Course specific skill objectives

ب1- Ability to use mathematics and physics to apply basic equations to calculate compressible flow properties.

ب2- Be able to analyze and interpret the characteristics of compressible flow in different cases according to flow conditions and influencing factors such as friction and heat transfer.

ب3- Apply and evaluate the propulsion efficiency of turbojet engines, understand the factors affecting them, and analyze the calculation results.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor EgaDSoftware solutions for various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1 Chapter 1: Compressible Flow Basics,Introduction to the basic equations and relationships of compressible flow. Review of some of the thermodynamic relationships used in compressible flow..

Week 2 Chapter 1: Compressible Flow Basics,Freezing states, Mach waves and Mach cones.

Week 3, Chapter 2: Isentropic Flow,Isentropic flow through channels of variable area.

examshort

Week 4, Chapter 2: Isentropic Flow,Nozzles and Expanders - Convergent Nozzles and Convergent-Expanding Nozzles and Their Applications. Use of Gas Tables.

Week 5 Chapter 2: Isentropic Flow,Nozzles and Expanders - Convergent Nozzles and Convergent-Expanding Nozzles and Their Applications. Use of Gas Tables.

Week 6, Chapter 2: Isentropic Flow,Nozzles and Expanders - Convergent Nozzles and Convergent-Expanding Nozzles and Their Applications. Use of Gas Tables. examshort

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. examshort

Week 10 Chapter 4: Flow Through Channels,Flow through constant-area channels with friction (Fano flow) - Using tables and diagrams - Generalized gas dynamics.

Week 11 Chapter 4: Flow Through Channels,Flow through constant area channels with heat transfer (Rayleigh flow) - Using tables and diagrams - 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 diagrams - Generalized gas dynamics.

examshort

Week 13 Chapter 5: Aircraft Propulsion,Aircraft propulsion theory - Propulsion equation - Thrust force and propulsion efficiency - Operating principle, cycle analysis and use of stalled state performance of turbojet, turbofan and turboprop engines.

Week 14 Chapter 5: Aircraft Propulsion,Aircraft propulsion theory - Propulsion equation - Thrust force and propulsion efficiency - Operating principle, cycle analysis and use of stalled state performance of turbojet, turbofan and turboprop engines. examshort

Week 15 Chapter 5: Aircraft Propulsion,Rocket engine

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Michel A. Saad, "Compressible Fluid Flow, Second Edition". 1.

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)

Description of the academic program with its courses Date of update:

A- Recommended books and references(The fieldAScientific T,Reports...., sitesNoElectronic Sober.

Library locations in some international universities.

B - ReferencesNoElectronic,SitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldGas dynamicsUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Electrical machinesI /Course code: ME316**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (60) hour**

Description of the academic program with its courses Date of update:

7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The aim of this courseIt is to provide students with a deep and comprehensive understanding of the fundamentals and theories associated with the operations of various electrical machines, including electric generators and motors. This understanding is achieved through the study of basic principles, electromotive force equations, equivalent circuits, and examination of voltage and efficiency variations along with the operational performance characteristics of various types of major electric motors and generators. This is achieved through a combination of theoretical concepts, practical tests and experimental evaluations, with the aim of enabling students to analyze, design and implement effective solutions in practical applications of electrical machines.

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

أ- **Cognitive objectives**

أ1- Learn and understand the basic principles of operation of electrical machines, including motors and generators (tension and magnetic induction).

أ2- Ability to understand and use electromotive force equations (EMF) and equations related to leakage reactions and equivalent circuits.

أ3- Ability to calculate and perform evaluations related to voltage regulation and efficiency of electrical machines.

أ4- Understand how a rotating magnetic field is produced, analyze synchronous speed and slip, and interpret equivalent circuits and speed-torque curves.

ب- Course specific skill objectives

ب1- Gain practical skills to operate and maintain different types of electrical machines such as motors and generators.

ب2- Develop the ability to diagnose common faults in electrical machines and apply effective solutions to repair them.

ب3- AUse electrical measuring instruments such as ammeters, voltmeters and digital multimeters to evaluate the performance of electrical machines.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groupsSmall and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Description of the academic program with its courses Date of update:

Evaluation methods

•Interaction within the lecture.

•Homework and reports.

•Short tests (quizzes)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

Description of the academic program with its courses Date of update:

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:Basics of magnetic and electric fields.- Faraday's and Lenz's laws.

Week 3 Types and methods of electrical conduction:Types of conductors and connection methods. - DC and AC circuits.

Week 4 Electric Generators: - Basic principles of generator operation. - Types of generators and their uses.

Week 5 Generators:Basic principles of generator operation.- Types of generators and their uses.

Week 6 Generators: Basic principles of generator operation. - Types of generators and their uses.

Week 7 Synchronous Machines: - Principles of Operation of Synchronous Machinesintention

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.

Description of the academic program with its courses Date of update:

Week 11 of maintenance and periodic treatmentBasics of periodic maintenance of machines.- Troubleshooting and treatment.

Week 12 of Electrolytic Analysis and Charts Use charts to understand machine performance. - Performance analysis using modern software.

Week 13 Advanced Applications: Advanced applications in industry and energy.- The 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 15review

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Edward Hughes - Hughes electrical and electronic technology [electronic resource]-Pearson Education (2012).pdf .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific T,Reports...., sitesNoElectronic Sober.

Library locations in some international universities.

B - ReferencesNoElectronic,SitesunlessInternet

12. Curriculum Development Plan

Description of the academic program with its courses Date of update:

Adding the latest research and technologies inElectrical machinery fieldUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Manufacturing processesI /Course code: ME317**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFirst/StageThird**
6. **Total number of study hours (75) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The aim of this courseIt is to provide students with a comprehensive understanding of the fundamental 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, ensuring efficiency, quality and sustainability.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Understand the basic principles of iron and steel manufacturing processes.

أ2- Describe the characteristics and techniques of different casting processes.

أ3- Explain the principles of metal forming processes, including hot and cold working.

أ4- Learn the difference between different metal cutting and shaping processes.

أ5- Understand how lathe machines work and their applications in metalworking.

ب- Course specific skill objectives

ب1- Analysis and selection of appropriate materials and processes for manufacturing various metal products.

ب2- Performing sand casting and die casting operations, including preparation, shaping and finishing.

ب3- Perform metal forming operations such as forming, rolling, extrusion, and drawing.

ب4- Operate lathe machines to perform various operating tasks.

ب5- 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 tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

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According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

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•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingnoFinding software solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Introduction to Manufacturing ProcessesA- Iron and Steel Industry Overview-Introduction to Iron Ore and Cast Iron Industry

Week 2 Cast Iron Making Process-Blast furnace operation-Introduction to Steelmaking Processes

Week 3 Steelmaking Processes-Casting Basics and Characteristics of Casting Processes

Description of the academic program with its courses Date of update:

Week 4 Introduction to Sand Casting-Sand materials and sand testing-Patterns and molding machines

Week 5 Casting Furnaces-Cleaning and inspection of cast products-Pressure casting methods

Week 6 Other Casting Methods: Centrifugal Casting-lost wax casting-Formation process by chance

Week 7 continuous casting-Introduction to Metal Forming-hot working of metals

Week 8 Cold Working of Metals-Types of blacksmithing operations-Blacksmithing Hand Tools

Week 9 Blacksmithing with Automatic Machines-Rolling Mills-Calculate the contact angle in rolling

Week 10 Hot and Cold Rolling Operations-Extrusion methods-Pipe extrusion

Week 11 Shock Extrusion-Wire drawing machines-Pipe drawing machines

Week 12 Preparing minerals for drawing-Sheet metal forming processes-sheet metal connections

Week 13 Soldering Metal Cutting: Carving, Filling, Sawing

Week 14 Introduction to Lathe Operations-Types of lathe machines-lathe machine parts

Week 15 Lathe as a Multipurpose Machine-General review of the curriculum

Week 16 Preparatory week before the final exam

Description of the academic program with its courses Date of update:

11-AInfrastructure:

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(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inManufacturing Operations Field Use textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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.

Description of the academic program with its courses Date of update:

Course Description

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achievedThe model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Numerical analysis /Course code: E321**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (75) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The 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 language and write simple codes using the languageMATLAB.

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

أ- Cognitive objectives

أ1- Apply numerical computation techniques to solve linear algebraic equations and simultaneous linear equations.

أ2- Understand the basics of specific difference and packing techniques.

أ3- Understanding numerical differential and integral calculus.

أ4- Apply appropriate methods to overcome limitations of representing experimental data.

أ5- Understand the numerical solution of ordinary differential equations.

أ6- Understand the numerical solution of partial differential equations.

أ7- Understand the basic concepts of the finite element method.

ب- Course specific skill objectives

ب1- Solve mechanical engineering problems numerically using a programming language (LanguageMATLAB).

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groupsSmall and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Description of the academic program with its courses Date of update:

Evaluation methods

•Interaction within the lecture.

•Homework and reports.

•Short tests (quizzes)

•theExamsQuarterly and final.

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Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

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Evaluation methods

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د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

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د7- Gain time management and project management skills while working on complex engineering problems.

Description of the academic program with its courses Date of update:

10. Course structure

Week 1: Chapter 1: Solving Linear Algebraic Equations - Fixed Point Iteration Method and Newton-Raphson Method

Week 2: Chapter 2: Solving Simultaneous Linear Systems of Equations - Gauss-Seidel Method and Gauss Elimination Method

Week 3: Chapter 2: Solving Equations of Simultaneous Linear Systems - Gauss's Elimination Method (Continued) - Gauss-Jordan Method - Quiz

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 - 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 - Earthen Collection Cavities and Strong Function Cavities

Week 9: Chapter 6: Numerical Solution of Ordinary Differential Equations - Euler's First Order Method and Modified Euler's Method - Short Quiz

Description of the academic program with its courses Date of update:

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 Laplace's Equation in 2D - Short Quiz

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 stress analysis problems in one dimensions, solving heat transfer problems

Week 16 Preparatory week before the final exam

Weekly lab schedule

Week 1-2: Programming LanguageCode to find the roots of nonlinear equations.

Week 3-4: Programming LanguageCode for matrix results from a system of linear algebraic equations.

Week 5: Programming LanguageCode for generalization.

Week 6-7: Programming LanguageCode for numerical integration.

Week 8-9: Programming LanguageCode to fit the curvature.

Week 10-12: Programming LanguageCode for solving numerical ordinary differential equations.

Week 13-15: Programming LanguageCode for solving numerical partial differential equations by the final difference method.

11-AInfrastructure:

1- Required Textbooks

Numerical Methods for Engineers and Scientists", An Introduction with .1 Applications Using MATLAB. by Amos Gilat and Vish, Wiley 3rd edition, 2014

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldNumerical analysisUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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.

Description of the academic program with its courses Date of update:

Course Description

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Heat transferII /Course code: ME322**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (90) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The 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 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**

أ- **Cognitive objectives**

Description of the academic program with its courses Date of update:

أ1- Providing students with the necessary knowledge about the methods of heat transfer.

أ2- Learn the laws of heat transfer and how to calculate them.

أ3- Understand the calculation of thermal loads in heat transfer systems.

أ4- Identify the relationships studied in the context of heat transfer.

ب- Course specific skill objectives

ب1- Develop students' skills in calculating thermal loads for heat transfer systems.

ب2- Study the applications of heat transfer and apply them in practical situations.

ب3- Identify important design criteria related to heat transfer applications and systems.

ب4- To enhance students' ability to design and analyze heat transfer systems efficiently.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skillsIt is further developed by a set of problems prepared by lecturers fromNoStudy groupsSmall and ratedunlessRespond to

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Evaluation methods

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

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Teaching and learning methods

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According to the subject and the curriculum of the subject.

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According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor EgaDSoftware solutions for various problems.

د3- Developing the student's ability to dialogue and discuss.

ر4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

ر5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

ر6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

ر7- Gain 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,thermal boundary layer

Week 3: Chapter 1: Introduction to Convection,Analysis of non-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,a testshort

Week 6: Chapter 2: Introduction to External Flow,Flow around cylinder and ball,flow around pipe bundles

Week 7: Chapter 3: Introduction to Internal Flow,Average temperature,Laminar and turbulent flow in pipes

Description of the academic program with its courses Date of update:

Week 8: Chapter 3: Introduction to Internal Flow,Hydrodynamic and thermal entry zone

Week 9: Chapter 3: Introduction to Internal Flow,Empirical relationship of pipe flow

Week 10: Chapter 4: Introduction to Natural Convection,Free convection from vertical plate,Free convection from inclined plate,a testshort

Week 11: Chapter 4: Introduction to Natural Convection, aTo carry the free heat from the horizontal plate

Week 12: Chapter 4: Introduction to Natural Convection,Free convection of horizontal cylinder and 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 mean temperature,Method of effectiveness-NTU

Week 16 Preparatory week before the final exam

Weekly lab schedule

Week 1: Lab 1: Heat Transfer by Linear and Axial Radiation in Solids

Week 2: Lab 2: Heat Transfer by Linear and Axial Radiation in Solids

Week 3: Lab 3: Extended Surface Effectiveness (Pin Fins)

Week 4: Lab 4: Extended Surface Effectiveness (Pin Fins)

Week 5: Lab 5: Radiation Heat Transfer Experiment

Week 6: Lab 6: Radiation Heat Transfer 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 Exam

11-AInfrastructure:

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)

Description of the academic program with its courses Date of update:

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

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12. Curriculum Development Plan

Adding the latest research and technologies in the fieldHeat transferUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

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1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Machine theoryCourse code: ME 323**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (45) hour**

Description of the academic program with its courses Date of update:

7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The 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, as well as 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**

أ- Cognitive objectives

أ1- Understand the concepts of velocity and acceleration graphs and their applications in linear and angular motions.

أ2- Learn about the types of cams and followers and understand the uses of each type.

أ3- Study gear terminology and understand its effects on the design of mechanical systems.

أ4- Analysis of the role of flywheels in the stability and performance of engines.

ب- Course specific skill objectives

ب1- Ability to draw and interpret velocity and acceleration graphs for linear and angular motions.

ب2- Apply graphs to calculate point velocities on rolling objects.

ب3- Design and build cam files based on specific motion requirements.

ب4- Analysis and selection of suitable gear types for different mechanical applications.

ب5- Calculation and design of flywheels to meet system stability and performance requirements.

Teaching and learning methods

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Evaluation methods

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د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain 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).

Description of the academic program with its courses Date of update:

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,Coriolis component and equivalent coupling.

Week 5: Chapter 3: Introduction to Cams and Followers,introduction.

Week 6: Chapter 3: Cams and Followers,Disturbance fees. Types of movements. Build cam file.

Week 7: Chapter 3: Cams and Followers,Build 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 number of teeth.

Week 10: Chapter 4: Introduction to Gears,Gear systems.

Week 11: Chapter 5: Flying Wheels,introduction.

Week 12: Chapter 5: Flying Wheels,Flywheels for internal combustion engines. a testshort.

Week 13: Chapter 5: Flying Wheels TMD and related transactions.

Week 14: Review

Description of the academic program with its courses Date of update:

Week 15: Chapter 6: Introduction to Machine Design,Introduction to Design Problems

Week 16 Preparatory week before the final exam

Weekly lab schedule

Week 1: Lab 1: Crankshaft Speed(Crank Slider Mechanism)

Week 2: Lab 2: Velocity of Four and Five-Part Mechanisms

Week 3: Lab 3: Crankshaft Acceleration(Crank Slider Mechanism)

Week 4: Lab 4: Acceleration of Four- and Five-Part Mechanisms

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 and UAR)

Week 8: Lab 8: Cam Profiles for Uniform Acceleration and Deceleration(UAR)

Week 9: Lab 9: Gears and Wheels(Gears and Pinions)

Week 10: Lab 10: Gear Classification(Classification of Gears)

Week 11: Lab 11: Gear Systems(Gear Trains)

Week 12: Lab 12: Flying Wheels and Moment of Mass

Week 13: Lab 13: Review

Week 14: Lab 14: Exam

Week 15: Lab 15: Final Exam

Description of the academic program with its courses Date of update:

11-AInfrastructure:

1- Required Textbooks

Theory of Machines by RS Khurmi. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

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1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**

Description of the academic program with its courses Date of update:

3. **Course Name/Code:internal combustion engines**II / Course code: **ME324**
4. **Available forms of attendance: in-person or online**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (45) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

Teaching types of fuel for engines. Teaching combustion chamber phenomena (crackling, combustion, flame spread, and various flow movements). Develop your understanding of the ignition process and ignition system.. Understand the importance of general combustion theory. Description of different engine systems.

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

أ- Cognitive objectives

أ1- Understand the heating value of fuels and their importance in the combustion process.

أ2- Identify the properties and classifications of spark and cumulative combustion engine fuels.

أ3- Study the carburetor process and systems and understand how performance variables affect their performance.

أ4- Analysis of general combustion theory and factors affecting flame propagation velocity and rate of pressure rise.

أ5- Study of fuel injection systems, types of cumulative combustion engines and factors affecting ignition delay.

أ6- Learn about engine cooling and lubrication systems and their potential problems.

Description of the academic program with its courses Date of update:

ب- Course specific skill objectives

ب1- Ability to calculate and evaluate the heating value of fuel.

ب2- Application of information about the fuel properties of spark and cumulative combustion engines to system designs.

ب3- Design and analyze the performance of carburetor systems and deal with their variables to improve performance.

ب4- Using general burnout theory to evaluate and improve performance.

ب5- Evaluate and select fuel injection systems and understand their effects on engine performance.

ب6- Diagnose problems with cooling and lubrication systems and implement solutions to improve performance and efficiency.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each

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- Homework and reports.
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ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

Description of the academic program with its courses Date of update:

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

7- Gain 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 fuel.

Spark Combustion Engine Fuel Classifications.

Week 2: Chapter 1: Fuels for Internal Combustion Engines and Combustion Calculations,Important Properties of Spark Combustion Engine Fuels.

Week 3: Chapter 1: Fuels for Internal Combustion Engines and Combustion Calculations,Properties and classifications of cumulative combustion engine fuels. Combustion calculations.

Week 4: Chapter 2: The Rounding Process and Carburetors,Main measurement system. Simple carburetor.

Carburetor performance with measurement variables.

Week 5: Chapter 2: The Rounding Process and Carburetors,Mixture control and types of carburetors. carburetor injection.

Week 6: Chapter 3: Spark Ignition,Ignition System Requirements. Battery ignition system.

magneto ignition system. Spark plugs. ignition timing.a testshort.

Description of the academic program with its courses Date of update:

Week 7: Chapter 4: Combustion in Spark-Combustion Engines,General combustion theory. Natural combustion and flame spread.

Week 8: Chapter 4: Combustion in Spark-Combustion Engines,Factors affecting flame propagation rate. rate of rise in pressure. abnormal combustion. Engine operating variables that affect detonation.

Combustion chamber design.

Week 9: Chapter 5: Cumulative Combustion Engine and Fuel Injection System,General information about the characteristics of the 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,The sound of explosion 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. a testshort.

Week 14: Chapter 8: Lubrication in Internal Combustion Engines,Lubrication mechanism. Types of bearings used in internal combustion engines. Properties of lubricating oils. Add-ons. Lubrication systems.

Week 15: Chapter 9: Engine Design,Primary analysis, number of cylinders, size and arrangement. Detailed design procedures.

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Engineering Fundamentals of the Internal Combustion Engine. .1

Willard W. Pulkrabek. University of Wisconsin.

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inInternal combustion engine field Use textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Turbine machines /Course code: ME325**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (90) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The course aims to teach students how to distinguish turbomachinery 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 turbomachinery from first principles, and deriving different types of efficiencies and energy for various types of turbomachinery. In addition, the course covers the use of analogy and simulation methods to design any prototype turbomachinery using basic information from any standard turbomachinery under similar design conditions. It also includes the analysis

of the flow over the blade surfaces of any turbomachinery and the use of the data extracted from these analyses to calculate the performance characteristics of any turbomachinery.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Understand the application of the first and second laws of thermodynamics to turbomachinery.

أ2- Learn about dynamic rotary pump classifications, components and head types.

أ3- Understand and analyze velocity triangles and the effect of outlet blade angle in centrifugal pumps.

أ4- Know the concepts of cavity andNPSH and specific speed in pumps and fans.

أ5- Understand the performance characteristics of centrifugal pumps and select the appropriate pumps.

أ6- Study of types of water turbines such as impulse and reaction turbines and similarity laws.

أ7- Identify, analyze and describe axial and centrifugal compressors and their performance characteristics.

أ8- Understand gas turbine classifications, analyze speed charts, analyze multistage turbines and performance characteristics.

ب- Course specific skill objectives

ب1- Ability to apply the laws of thermodynamics to turbo machines.

ب2- Analyze and classify dynamic rotary pumps and understand their effects on performance.

ب3- Design and analysis of velocity triangles and blade angles to improve the performance of centrifugal pumps.

ب4- Diagnose and solve cavity problems andNPSH and specific speed in pumps.

ب5- Evaluate and select appropriate pumps based on performance characteristics and requirements.

ب6- Analysis of water turbine performance and application of similarity laws to turbine design.

ب7- Design and analyze axial and centrifugal compressors and understand their effects on performance.

ب8- Evaluate and analyze the performance of gas turbines and understand construction details and performance characteristics to improve efficiency.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles,

definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Description of the academic program with its courses Date of update:

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

7- Gain 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 turbo machines.

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,cavity,NPSH, specific speed.

Week 5: Chapter 2: Pumps and Fans,cavity,NPSH, specific speed. a testshort.

Week 6: Chapter 2: Pumps and Fans,Performance characteristics of centrifugal pump, series and parallel operation of pumps, system resistance curve, selection of pumps.

Week 7: Chapter 3: Water Turbines,Impulse turbine - Pelton type.

Week 8: Chapter 3: Water Turbines,Impulse turbine - Pelton type. a testshort.

Description of the academic program with its courses Date of update:

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 specific quantities.

a testshort.

Week 12: Chapter 4: The Compressor,Axial and centrifugal compressors, construction, phase velocity triangles and their analysis, flow through rows of blades, performance characteristics.

Week 13: Chapter 4: The Compressor,Axial and centrifugal compressors, construction, phase velocity triangles and their analysis, flow through rows of blades, performance characteristics. a testshort.

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. a test.

Week 16 Preparatory week before the final exam

Weekly lab syllabus

Week 1-2: Central Defense Characteristics

Week 3-5: Parallel Operation of Centrifugal Pumps

Week 6-8: Sequential operation of central pumps

Week 9-11: Pelton Turbine

Week 12-14: Francis Turbine

11-AInfrastructure:

1- Required Textbooks

1. Turbomachinery Design and Theory, (2003), Rama S.R. 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., PH.D. Fourth Edition.

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inTurbine machinery field Use textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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.

Description of the academic program with its courses Date of update:

Course Description

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Electrical machinesII /Course code: ME326**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (75) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The aim of this courseIt is to provide students with a comprehensive understanding of the fundamental principles and practical applications of synchronous generators and motors, 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**

أ- **Cognitive objectives**

أ1- Understand the basic equations and interactions in synchronous generators and motors.

Description of the academic program with its courses Date of update:

أ2- Explain the operation of synchronous motors, starting methods and their applications.

أ3- Learn about different types of bridge circuits and electronic components such as diodes, transistors, power amplifiers, andSCRs and their applications.

أ4- Understand electrical power distribution in industrial plants and designs for distribution, lighting and heating.

أ5- Measure and analyze electrical and non-electrical parameters such as current, voltage, power, pressure, velocity, flow, and temperature.

ب- Course specific skill objectives

ب1- Calculation and regulation of voltage regulation in synchronous generators.

ب2- Analysis and operation of synchronous motors and understanding of curvesV.

ب3- Installation and testing of bridge circuits and electronic components and their applications in practical circuits.

ب4- Design and implementation of industrial power distribution systems and power factor correction.

ب5- Measure and record electrical energy consumption and non-electrical parameters using various measuring instruments.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Description of the academic program with its courses Date of update:

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groupsSmall and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- formationDirectionMeaning that the student is sympathetic to the presentation and may have an opinion regarding the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingFor meJad provides software solutions for various issues.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Introduction to Synchronous Electric Machines-equationEMF in synchronous generators

Week 2Rotor reaction in synchronous generators-Voltage regulation in synchronous generators

Week 3Synchronization in synchronous generators-Introduction to Synchronous Motors

Week 4Working principle of synchronous motors-Methods of starting synchronous motors

Description of the academic program with its courses Date of update:

Week 5V-curves in synchronous motors-Synchronous motor applications

Week 6Introduction to Solid State Electronic Components-Binaries and their basics

Week 7Different bridge circuits-Transistors and Power Amplifiers

Week 8Thyristors (SCRs) and their applications-Design and implementation of bridge circuits

Week 9: Industrial power distribution means-Power Distribution Design in Factories

Week 10Substations-Protection of electrical systems

Week 11Relays and circuit breakers-Lighting and heating designs

Week 12Power factor correction-Measure current, voltage and power

Week 13Record energy consumption-Measurement of non-electrical parameters: pressure, velocity, flow, and temperature.

Week 14Extend the range of devices using a voltage divider.-Practical Applications Review

Week 15Comprehensive review of the course

The week:16 Preparatory week before the final exam

Weekly lab syllabus

Week 1: Lab 1: Introduction to DC Machine.

Week 2: Lab 2: Magnetic Saturation Curve.

Week 3:Lab 3:Independently Excited DC Machine Test.

Week 4: Lab 4: Testing of a parallel-excited DC machine.

Week 5: Lab 5: Open and short circuit test of induction machine.

Week 6: Lab 6: Synchronization Machine Test.

Week 7: Lab 7: Transmission Line.

11-AInfrastructure:

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(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inElectrical machinery field Use textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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.

Description of the academic program with its courses Date of update:

Course Description

The model description provides a brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Manufacturing processesII /Course code:ME327**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapter AFor the second/StageThird**
6. **Total number of study hours (30) hour**
7. **Date this description was preparedFebruary 2025**
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 brazing processes, as well as in the operation of conventional and modern machines includingCNC and Non-Traditional Machining Methods. 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**

أ- Cognitive objectives

أ1- Understanding the classifications and applications of forming machines.

Description of the academic program with its courses Date of update:

أ2- Description of types of grinding machines and their operations.

أ3- Explanation of drilling operations and the machines used in them.

أ4- Learn about the types of grinding machines and the tools used..

أ5- Understand the principles and techniques of various welding including arc welding and gas welding..

أ6- Knowledge of fusion welding, solid state welding and non-conventional welding techniques.

أ7- Understanding the differences between traditional and automated machinesCNC and the financial and technical advantages of CNC.

أ8- Learn about non-traditional machining techniques such as ultrasonic machining, chemical machining and electric spark machining.

ب- Course specific skill objectives

ب1- Classification and application of different shaping operations.

ب2- Operate grinding machines and perform various operations on them..

ب3- Use drilling and boring machines skillfully..

ب4- Perform grinding operations using various machines and tools..

ب5- Practical application of various welding techniques.

ب6- Efficiently perform fusion and solid-state welding operations..

ب7- Operating machinesCNC and application of acquired skills in production.

ب8- Using unconventional operating techniques to achieve accuracy and efficiency in production.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1-Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingnoFinding software solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Introduction to shaping processes-Classification of forming machines

Week 2Introduction to milling processes-Types of grinding machines

Week 3Drilling Operations: Types of Drills and Reamers-Drilling and Boring Machines

Week 4Introduction to grinding processes-Types of grinding machines

Week 5Grinding tools and their uses-Introduction to Welding Techniques

Week 6Electric arc welding and metal arc welding-Gas welding and plasma welding

Week 7Fusion welding techniques: oxyacetylene welding, thermal welding-Electron beam welding and laser welding

Week 8Ultrasonic welding and diffusion welding-Projection welding and spark welding

Week 9Electric resistance welding and friction welding-Explosion welding

Week 10Introduction to CNC Machines-identificationNC and comparison with conventional machines

Week 11Financial and technical advantages of CNC machines:-direct digital control(DNC) and CAD/CAM

Week 12Hierarchical Numerical Control (NC)-Introduction to Non-Traditional Operation

Week 13Ultrasonic and chemical machining-Electrochemical and spark ignition

Week 14Electron beam and laser operation-Electronic grinding operation

Week 15Comprehensive review of the course

Week 16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Manufacturing processes, second edition; HN Gupta, RC Gupta, Arun Mittal; Published by New Age International (P) Ltd., Publishers. 1.

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(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies in the fieldManufacturing processesUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

Description of the academic program with its courses Date of update:

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Machine parts designI /Course code: ME 411**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe first/StageFourth**
6. **Total number of study hours (105) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This 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**

أ- Cognitive objectives

أ1- Understand the basic design process including stresses, strains and strain energy.

أ2- Know how to estimate safety factors, their importance and ranges.

أ3- Analysis of stresses and strains in curved beams (tensile, flexural and composite).

أ4- Understand the different elastic failure theories (yield stress theory, ultimate stress theory, ultimate shear stress theory, strain energy theory).

أ5- Know the typesSpringsDifferent and induced stresses.

أ6- Understanding the properties ofSpringsSpiral and pointerThe pulseAnd the stresses induced in it.

أ7- Know the types and importance of stresses resulting from fatigue and how to analyze them.

أ8- Understanding the curveSN and how to achieve it and analyze the average and effective stresses of oscillating loads.

أ9- Know the reliability of the designed components.

أ10- Understand the different types of screws and threads and the stresses induced in them.

أ11- Know how to design pressure vessels (thin and thick) and analyze the stresses induced in them.

أ12- Understanding the basics of computer-aided design (CAD) and its use in mechanical design.

ب- Course specific skill objectives

ب1- Apply the design process to analyze stresses and strains in mechanical components.

ب2- Calculating and estimating safety factors in different designs.

ب3- Analysis of stresses and strains in curved beams using appropriate theories.

ب4- Conducting stress analysis tests on various machines and mechanical components.

ب5- Design and selection ofSpringsSpiral according to engineering standards.

ب6- Application of elastic failure theories to stress analysis in mechanical components.

ب7- Conduct fatigue stress analyses and determine endurance limit.

ب8- Design and selection of bolts and fasteners based on loading requirements.

ب9- Design and analysis of pressure vessels to ensure their safety and efficiency.

ب10- Use of computer-aided design software (CAD) in creating and analyzing mechanical designs.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT details on completely new topics and unsolved examples, which will be solved on a whiteboard and displayed for students to review.

Description of the academic program with its courses Date of update:

Evaluation methods

•Interaction within the lecture.

•Homework and reports.

•Short tests (quizzes)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

Description of the academic program with its courses Date of update:

10. Course structure

Week 1: Chapter One: Introduction to the Design Process. Design process basics, stresses and strains, and strain energy.

Week 2: Chapter One: Introduction to the Design Process. Safety factors assessment, their importance and scopes.

Week 3: Chapter Two: Stress and Strain Analysis. Stress and strain analysis of curved beams (tensile, flexural and composite).

Week 4: Chapter Two: Stress and Strain Analysis. Elastic failure theories (yield stress theory, ultimate stress theory, ultimate shear stress theory, strain energy theory). Short test.

Week 5: Chapter Three: Introduction to DesignSprings. Types ofSpringsand the stresses induced in it.

Week 6: Chapter Three: Introduction to Designsprings,theSpringsSpiral. Index ofSprings. Induced stresses in theSpringsSpiral.

Week 7: Chapter 4: Introduction to Fatigue Stress Failure. Stress, Types and Importance. Mix of download modes.

Week 8: Chapter 4: Introduction to Fatigue Stress Failure. Average and effective stresses for oscillating loads. curvedISN and how to achieve it.

Week 9: Chapter 4: Introduction to Fatigue Stress Failure. Reliability of designed components.

Week 10Chapter Five: Introduction to Screws and Fasteners. Types of screws. Types ofFor fixers.

Week 11: Chapter Five: Introduction to Screws and Fasteners. Induced stresses in bolts and their calculations.

Week 12: Chapter Five: Introduction to Screws and Fasteners. Strong screws, typesFixativesand induced stresses.

Week 13: Chapter 6: Introduction to Pressure Vessel Design. Types of pressure vessels (thin and thick). balance of external and internal powers. Short test.

Week 14: Chapter 6: Introduction to Pressure Vessels. Stresses induced by internal pressure in thin cylinders. Emotions and change in size.

Week 15: Chapter 7: Introduction to Computer-Aided Design(CAD). Introduction to Computer Aided Design (CAD).

The week:16 Preparatory week before the final exam

Weekly lab syllabus

Week 1: Lab 1: Connecting Mechanical Components.

Week 2: Lab 2: Calculating stresses for three components in a mechanism.

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 Curved Beam Analysis(Lifting hook and S-cell type load).

Week 6: Lab 6: Tensile Testing and Safety 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 Limit”"

Week 10: Lab 10: Overview of Screw and Fastener Manufacturing.

Week 11: Lab 11: Power Screws (Screw Lever Analysis).

Week 12: Lab 12: Computer Aided Design Software(CAD) and design processes.

Week 13: Lab 13: Review.

Week 14: Lab 14: Testing.

Week 15: Lab 15: Final Exam.

11-AInfrastructure:

1- Required Textbooks

Machine Design by RK Jain..11

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inMachine parts design field Use textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapterthe first/StageFourth**
6. **Total number of study hours (45) hour**
7. **Date this description was preparedFebruary 2025**
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 understanding of control theory through the application of various techniques.. Understanding the ability to recognize, analyze, and design feedback control systems is an important learning outcome; the feedback principle 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 more.. Understanding the mechanical elements used in control systems.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Students will be able to describe feedback control systems mathematically using various equations, transfer functions, and state space models.

أ2- Students will be able to analyze whether a given control system is stable or not, and what needs to be done to make it stable.

أ3- Students will be able to define and explain the structure of feedback and feedforward control, and discuss the importance of performance, robustness, and stability in control design.

أ4- Students will be able to interpret and apply block diagram representations of control systems and microcontroller design.PID based on empirical tuning rules.

أ5- Students will be able to calculate the stability of linear systems using the Rath array test and use this to generate control design constraints. Students will be able to understand and find the controllability and observability of control systems.

ب- Course specific skill objectives

ب1- Students will be able to analyze how this is achieved (synthesis) and how the solution will affect the performance of the system (evaluation). Students will gain confidence in solving any problems in the field of control systems within the specified scope.

ب2- Students will be able to master control systems design tools such as:Matlab and Simulink.

ب3- Students will be able to use root location techniques.Evans in control design for real-world systems.

ب4- Students will be able to calculate gain and phase margins from Bode and Nyquist plots and understand their implications in terms of robust stability.

ب5- Students will be able to design compensators.Lead-Lag 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 tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

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ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

Description of the academic program with its courses Date of update:

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinkingnoFinding software solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1: Introduction and Review of Mathematics (Chapter 1)

Description of the academic program with its courses Date of update:

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: Systems Responses (Chapter 4)

Week 6: Systems 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 Location (Chapter 7)

Week 10: Root Location (Chapter 7)

Week 11: Bandwidth Analysis (Chapter 8)

Week 12: Bandwidth Analysis (Chapter 8)

Week 13: Tuning in the Bandwidth (Chapter 9)

Week 14: Tuning in the Bandwidth (Chapter 9)

Week 15: Preparation week before the final exam

The week:16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Description of the academic program with its courses Date of update:

Modern Control Engineering by Katsuhiko Ogata Frank P. Incropera, .1
David P. Dewitt, Seventh Edition, 2011.

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inControl area andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**

Description of the academic program with its courses Date of update:

3. **Course Name/Code:Air conditioning and refrigeration /Course code: ME413**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe second/StageFourth**
6. **Total number of study hours (90) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

The overall objective of the course is to provide students with a comprehensive understanding of the properties of air and water, and to analyze the processes thatYour stickMetrics for designing air conditioning systems, calculating cooling and heating loads, and designing air distribution systems. The course aims to enable students to apply these concepts in the design and efficient operation of air conditioning and refrigeration systems.

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

أ- Cognitive objectives

أ1- Understanding the properties of air and water and the factors affecting air conditioning.

أ2- Use the drawingYour stickMetric to analyze different processes in air conditioning.

أ3- Calculating cooling and heating loads based on various factors affecting human comfort..

أ4- Design air distribution systems and know the different design procedures.

ب- Course specific skill objectives

ب1- Conducting psychometric calculations and data analysis using the chartYour stickAnd metric.

ب2- Accurately calculate cooling and heating loads for various design cases..

ب3- Design air distribution systems using correct methods and pressure loss analysis.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

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ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoRegularUsingWriting board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical presentation methodUsingdevice(show data)noDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Properties of air and water-Definition of air conditioning and ventilation

Week 2Law of partial pressures-Ideal gas law and vapor pressure of moisture

Description of the academic program with its courses Date of update:

Week 3Moist 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 adiabatic saturation

Week 4Psychrometric chart for air conditioning processes-Air mixing and operations on the chart

Week 5:Heating and cooling the sensor-Evaporation and dehumidification, bypass and contact factors, sensitive heat ratio

Week 6:Heat load calculation: human comfort factors, comfort measures, effective temperature-Selection of interior and exterior design conditions

Week 7Heat transfer through walls and surfaces, design temperature of unconditioned spaces-Solar radiation transmission through glass, shading, heat gain from walls and roofs

Week 8Heat loss from the human body and ventilation requirements-Heat loss from infiltration, opening methods and air exchange

Week 9Lighting loads, miscellaneous heat losses-Calculate total heat loads

Week 10Heating load calculation-Design calculation for heating systems

Week 11-Air Distribution System Design: Duct Design Procedures, Equal Friction Method-Fans and fan laws, single and multi-zone fan systems

Week 12Air distribution output, system pressure losses-Preparing for practical experiments in air conditioning and refrigeration systems

Week 13Conducting practical experiments-Air conditioning systems performance analysis

Description of the academic program with its courses Date of update:

Week 14Practical applications and design models

Week 15Comprehensive review of the course

The week:16 Preparatory week before the final exam

Weekly lab schedule

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 Drawing Processes

Week 4: Lab 4: Psychometric Drawing Processes

Week 5: Lab 5: Cooling and Dehumidification

Week 6: Lab 6: Cooling and Dehumidification

Week 7: Lab 7: Warming and Humidification

Week 8: Lab 8: Warming and Humidification

Week 9: Lab 9: Vapor Compression Refrigeration System

Week 10: Lab 10: Vapor Compression Refrigeration System

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

Description of the academic program with its courses Date of update:

11-AInfrastructure:

1- Required Textbooks

Jones, W.P., 2007. Air conditioning engineering. Routledge. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inAir conditioning and refrigeration fieldUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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

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1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**

Description of the academic program with its courses Date of update:

3. **Course Name/Code:Engineering materials /Course code:ME415**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe first/StageFourth**
6. **Total number of study hours (30) hour**
7. **Date this description was preparedFebruary 2025**
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 totheEngineering materialsYAnd

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

أ- Cognitive objectives

أ1- Knowledge of different types of engineering materials.

أ2- Name different types of steel and identify the structural differences, distinguishing properties and typical uses of each.

أ3- Name the five types of cast iron, describe the microstructure, and determine the general mechanical properties of each.

أ4- Know different types of non-ferrous alloys and identify their distinctive physical and mechanical properties.

أ5- Explain the purposes and describe the following heat treatment procedures: process fermentation, normalization, and complete fermentation.

أ6- Describe a typical polymer molecule in terms of its chain structure and how the molecule is generated from repeating units.

أ7- Name and describe the four general types of molecular structures of polymers and the four types of copolymers.

أ8- Identify the differences in behavior and molecular structure between thermosetting and thermosetting polymers.

أ9- Describe the process used to produce glass-ceramics.

أ10- Naming types of clay products and forms of carbon.

أ11- Identify three important requirements that must typically be met by refractory ceramics, abrasive ceramics and cement.

أ12- Name and describe some of the forming methods used to manufacture glass pieces.

ب- Course specific skill objectives

ب1- Describe the crack propagation mechanism for both ductile and brittle fracture modes.

ب2- Definition of fracture toughness and distinction between fracture toughness and plane tensile fracture toughness.

ب3- Define fatigue and identify the conditions under which it occurs.

ب4- Define creep, determine the conditions under which it occurs, and determine the constant creep rate and collapse age.

ب5- Distinguish between oxidation and reduction reactions in electrochemistry and explain the forms of corrosion and corrosion prevention.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

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Evaluation methods

•Interaction within the lecture.

•Homework and reports.

•Short tests (quizzes)

•theExamsQuarterly and final.

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Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

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•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

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د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

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د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain 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 for 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,Aluminum, Wrought Aluminum Alloys, Cast Aluminum 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,Crystal 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 concentration.

Week 10: Chapter 5: Composite Materials,Fiber phase, matrix phase, polymer matrix composites, metal matrix composites, ceramic matrix composites, layered composites, sandwich panels.

Week 11: Chapter 6: Mechanical Properties of Materials,Elastic deformation, stress-strain behavior, elastic properties of materials, tensile properties, true stress-strain, stiffness.

Week 12: Chapter 6: Fraction,Fracture basics, ductile fracture, brittle fracture, principles of fracture mechanics, impact fracture testing.

Week 13: Chapter 7: Fatigue,Cyclic stresses, curveSN, crack initiation and propagation.

Week 14: Chapter 8: Crawling,General creep behavior, influence 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.

The week:16 Preparatory week before the final exam

11-AInfrastructure:

2- Required Textbooks

Materials Science and Engineering an Introduction, William D. Callister, .11 JR. and David G. Rethwisch.

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inEngineering materials field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

Description of the academic program with its courses Date of update:

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Theory of vibrationsCourse code: ME415**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe first/StageFourth**
6. **Total number of study hours (45) hour**
7. **Date this description was preparedFebruary 2025**
8. **Course objectives:**

This course aims to learn the basic concepts of vibrations..andIt aims to acquire the skills necessary to deal with engineering problems and cases related to vibrations.. Calculation of deformation (response) of uncoupled and damped single-freedom systems resulting from initial stimulus, alternating force, cyclic load, and non-cyclic load. Find equivalent components for a mechanical vibration system.. How to avoid resonance in mechanical systems. How to write equations of motion and find natural frequencies of vibrating systems using the energy equation, Newton's second law, and Lagrange's equation.. Calculation of natural vibration modes and natural frequencies for single and multiple degree of freedom systems..

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

أ- **Cognitive objectives**

أ1- Gain a basic understanding of mechanical vibrations and develop skills in the analysis of vibration systems.

أ2- Ability to find the components of a vibration system (stiffness, mass or diffractive moment, and damping).

أ3- Ability to identify the type of motion of mechanical systems (oscillatory or non-oscillatory).

أ4- Use principles of mechanical vibrations such as Newton's second law, Lagrange's formula, and the principle of conservation of energy in mathematical models to obtain equations of motion governing vibrating systems.

أ5- Ability to analyze vibrations of uncoupled and damped single freedom systems.

أ6- Ability to find the vibration response of undamped one-freedom systems subjected to base stimulation and rotational unbalance.

أ7- Predicting the response of uncoupled and damped one-freedom systems subjected to cyclic loads.

أ8- Finding the response of uncoupled and damped one-freedom systems subjected to generalized loading functions.

ب- Course specific skill objectives

ب1- Determination of natural frequencies and modes for second- and multi-degree-of-freedom systems.

ب2- Ability to reduce vibration intensity.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Description of the academic program with its courses Date of update:

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

Description of the academic program with its courses Date of update:

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Introduction: Basics of vibrations, importance of studying vibrations, and basic concepts.

Week 2: Vibration classification: 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 systems with viscous damping. Test 1

Week 6: Forced vibrations: equation of motion for an uncoupled system.

Week 7: Forced Vibrations: 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 rotational unbalance.

Week 10: Vibration under general stimulating conditions: response under a general periodic function. Test 2

Week 11: Vibration under general stimulating conditions: response under irregular periodic force.

Week 12: Vibration under general stimulating conditions: response under non-periodic force. a report

Week 13: Multi-degree-of-freedom systems: derivation of the equation of motion, and influence coefficients.

Week 14: Multi-Degree-of-Freedom Systems: Lagrange's Equation.

Week 15: Multi-Degree-of-Freedom Systems: The Eigenvalue Problem. Test 3

The week:16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Theory of Vibration with Application, William T. Thomson. 2nd Edition .1

Mechanics of Machines Elementary Theory and Examples, J. H. Hannah .2
and R. C. Stephens. 4th Edition

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inThe field of applications of vibrations andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 brief description of the main features of the course. And the scientific outputs that are expected to be achieved

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**

Description of the academic program with its courses Date of update:

3. **Course Name/Code:Power stationsI /Course code: ME416**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe first/StageFourth**
6. **Total number of study hours (45) hour**
7. **Date this description was preparedFebruary 2025**
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**

أ- Cognitive objectives

أ1- Learn the general fundamentals of power plants, including the basic principles of thermodynamics, fluid mechanics, and heat transfer..

أ2- Understand the operating principles of conventional power plants such as steam, gas, nuclear, and diesel power plants, as well as hydroelectric power plants..

أ3- Describe the working principles of non-conventional energy plants such as fuel cells, solar cells, bioenergy, geothermal energy, marine energy, wind energy, wave energy, and tidal energy..

أ4- Performance analysis and evaluation of power plants using different thermal cycles.

ب- Course specific skill objectives

ب1- Analysis and design of power cycles in conventional power plants.

ب2- Performance evaluation of gas and steam power plants based on different thermal cycles.

ب3- Apply concepts and theories in the analysis of unconventional power plants and evaluate the effectiveness of each type.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

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ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

Description of the academic program with its courses Date of update:

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Description of the academic program with its courses Date of update:

Week 1General introduction to power plants-Review of the basics of thermodynamics, fluid mechanics, and heat transfer.

Week 2Definition of power plant concepts-Power Plant Classification

Week 3Operating principles of conventional power plants (steam, gas, nuclear, diesel, hydroelectric)

Week 4Working principles of non-conventional power plants (fuel cells, solar cells, bioenergy)

Week 5Operating principles of non-conventional energy plants (geothermal energy, marine energy, wind energy, wave energy, tidal energy)

Week 6Gas turbine power plants: types of gas cycles, working principles-Performance analysis for the basic cycle

Week 7: Modifications to the basic cycle of gas turbine power plants (reheating, recycling, multi-stage compression with cooling)

Week 8Steam Turbine Power Plants: Steam Power Cycles (Carnot Cycle, Ideal Rankine Cycle, Actual Rankine Cycle)

Week 9Performance analysis of simple steam cycle-Modifications to the simple Rankine cycle

Week 10Rankine cycle with superheating-Rankine cycle with reheating

Week 11Rankine cycle with rotation-Combined gas and steam power plants

Week 12:A comprehensive review of power plant concepts

Week 13Power Plant Performance Analysis

Week 14Practical applications and analysis models

Week 15: Comprehensive review of the course

The week:16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Power plant engineering AKRaja, Amit Prakash, Manish Dwivedi. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inPower station field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

Description of the academic program with its courses Date of update:

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapterthe first/StageFourth**
6. **Total number of study hours (30) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

The Industrial Engineering course aims to provide students with a comprehensive understanding of the fundamental 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 and systems.

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

أ- Cognitive objectives

أ1- Understanding the Fundamentals of Industrial Engineering: Gain knowledge about the basic principles, activities, and areas of focus in industrial engineering..

أ2- Understanding Decision-Making Theories: Learn different decision-making models, including game theory, and their applications in industrial settings..

Description of the academic program with its courses Date of update:

أ3- Understanding Operations Research: Understanding the Role and Trends of Operations Research and Engineering Economics.

أ4- Mastering Linear Programming: Understand the general form, assumptions, and methods of linear programming, including the simplex method..

أ5- Analysis of Assignment and Transfer Problems: Learn the mathematical formulas, algorithms, and solution methods for assignment and transfer problems..

أ6- Applying Prioritization Rules: Understand different prioritization rules such as:FCFS, SPT, EDD, and CR.

أ7- Explore the Fundamentals of Control and Maintenance Engineering: Learn the basic concepts of inventory management, control, and maintenance policies, including economic considerations..

أ8- Performing Break-Even Analysis: Understand and apply graphical and mathematical techniques for break-even analysis.

ب- Course specific skill objectives

ب1- Applying Decision-Making Models: Using Decision-Making Theories to Solve Real-World Industrial Problems.

ب2- Implementing Linear Programming Solutions: Formulating and Solving Linear Programming Problems Using the Simplex Method.

ب3- Solving Assignment and Transfer Problems: Using Algorithms to Efficiently Solve Assignment and Transfer Problems.

ب4- Using Prioritization Rules: Applying prioritization rules to improve scheduling and production processes.

ب5- Inventory and Maintenance Management: Develop and implement inventory and maintenance management policies..

ب6- Performing Break-Even Analysis: Performing and interpreting break-even analysis to make financial decisions.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

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Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

ذ- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1: Introduction to Industrial Engineering - Fundamentals, Activities, and Focus Areas.

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: The Assignment Problem - Introduction and Algorithms.

Week 11: The Assignment Problem - Unbalanced Assignment and Maximum Assignment.

Week 12: The Transport Problem - Introduction and Mathematical Formulation.

Week 13: Transportation Problem - Tabular Representation and Definitions.

Week 14: Prioritization Rules- FCFS, SPT, EDD, CR.

Week 15: Control Fundamentals - Basic Concepts, Control Management and Maintenance.

The week:16 Preparatory week before the final exam

11-AInfrastructure:

Description of the academic program with its courses Date of update:

1- Required Textbooks

Lectures for Industrial Engineering and Management .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inIndustrial engineering field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Machine parts design**II / Course code: **ME 421**

Description of the academic program with its courses Date of update:

4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe second/StageFourth**
6. **Total number of study hours (60) hour**
7. **This description was prepared in February 2025.**
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**

أ- Cognitive objectives

أ1- Understand gear types, design and analysis of contact forces.

أ2- Analysis and selection of rolling contact bearings.

أ3- Design and analysis of wall bearings.

أ4- Design and analysis of columns and their loading from the viewpoints of bending, torsion and repeated stress.

أ5- Analysis of different connections (bolts and welds).

ب- Course specific skill objectives

ب1- Design and analysis of various belt drive systems.

ب2- Analysis of the basic principles of clutch, brake and flexible coupling analysis.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Description of the academic program with its courses Date of update:

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1 Chapter 1: Introduction to Gear DesignBasic information about gear design process and stress calculations.

Week 2 Chapter 1: Introduction to Gear Design. Analysis of straight, helical and worm gears.

Week 3 Chapter 1: Introduction to Gear Design. Gear selection, number of teeth, and module.

Week 4 Chapter 1: Introduction to Gear Design. Bending stresses in gears and an introduction to Hertzian contact theory.

Week 5 Chapter 2: Introduction to Bearing Design. Types of bearings and their loads, and stresses on the inner and outer rings. a test.

Week 6 Chapter 2: Introduction to Bearing Design. Bearing load rating, dynamic load, and rating life. Bearing reliability and its relationship to life expectancy. Selection of bearings and use of standards.

Week 7 Chapter 3: Introduction to Roller Bearing Design. Hydrodynamic and hydrostatic lubrication systems. Lubricant viscosity and other considerations.

Week 8 Chapter 3: Introduction to Roller Bearing Design. Design and dimensions of slewing bearings.

Week 9 Chapter 4: Introduction to Column Design. Types of column and its support, column materials, bending and torsional stresses on columns.

Week 10 Chapter 4: Introduction to Column Design. Column design from bending, torsion and repetitive stress perspectives. Keys and grooves on the columns. a test.

Week 11 Chapter 5: Introduction to Conveyor Systems. Flat belt analysis (open and cross drive systems). Tensions, sheathing angles, initial tension for maximum power transfer.

Week 12 Chapter 5: Introduction to Conveyor Systems. Analysis and selection of thread belts.

Week 13 Chapter 6: Introduction to Welding and Adhesives. Types of welded joints. Lifting and differential joint analysis.

Week 14 Chapter 6: Introduction to Welding and Adhesives. Analysis of joints with rough and cover lifts.

Week 15 Chapter 7: Introduction to Computer-Aided Design(CAD/CAM). Introduction to Computer Aided Design.

The week:16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Machine Design by RK Jain .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inMachine parts design fieldUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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.

Description of the academic program with its courses Date of update:

Course Description

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

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapterthe second/StageFourth**
6. **Total number of study hours (90) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

This course aims to cover the basic use and application of mechanical and electronic sensors, transducers 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 transducers, as well as the analog and digital interconnection of these devices. It also includes a study of the use and application of various measuring devices.

Description of the academic program with its courses Date of update:

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Description of standard instruments designed in terms of mathematical and physical principles.

أ2- Understand how to use these tools in measurements.

أ3- Explains how converters integrate with analog and digital devices.

أ4- Understand the role of software in achieving the desired results of the measurement system.

أ5- Analyze how standard tools are designed.

أ6- Study how to measure different parameters using these tools.

أ7- Ability to design versatile measuring instruments and electronic systems.

أ8- Understand the different applications of these tools in various fields.

ب- Course specific skill objectives

ب1- Use of various mechanical and electrical devices for field measurements:

ب2- Gain practical skills in the use of mechanical and electrical measuring devices.

ب3- Apply these skills in real field environments.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)
- theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د-General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1: Basics of Measurement Systems,Measuring systems, signals, automatic measurements, specification terms.

Week 2: Types of tools and performance characteristics

Week 3: Display, record and present measurement data

Week 4: Measurement Errors,Sources of error, random and systematic errors, mean.

Week 5: Measurement Errors,Value and error, error collection, total tool error.

Week 6: Modeling Measurement Systems,Elements of degree zero, elements of degree one.

Week 7: Modeling Measurement Systems,Second order elements, 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 11: Measurement by Force, Torque and Pressure,Force measurement, torque measurement, pressure measurement, stress measurement.

Week 12: Flow measurement

Week 13: Temperature Measurement

Week 14: Stress Measurement

Week 15: Measuring Position and Motion,Linear displacement measurement, angular displacement measurement, velocity measurement, accelerometers.

The week:16 Preparatory week before the final exam

Weekly lab schedule

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: Measuring Mass, Force, and Torque

Week 6: Lab 5: Measuring Mass, Force, and Torque

Week 7: Lab 6: Measuring Temperature

Week 8: Lab 7: Measuring Temperature

Week 9: Lab 8: Measuring Pressure

Week 10: Lab 9: Flow Measurement

Week 11: Lab 10: Stress Scale

Week 12: Lab 11: Stress Scale

Week 13: Lab 12: Vibration and Shock Measurement

Week 14: Lab 13: Vibration and Shock Measurement

Week 15: Final Exam

11-AInfrastructure:

1- Required Textbooks

.1 Theory and Design for Mechanical Measurements

.2 Fifth Edition Richard S. Figliola Clemson University

.3 Donald E. Beasley Clemson University

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

Description of the academic program with its courses Date of update:

12. Curriculum Development Plan

Adding the latest research and technologies inMeasurement field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Air conditioning and freezingII /Course code: ME423**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe second/StageFourth**
6. **Total number of study hours (45) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

The course "Air Conditioning and Refrigeration" aims to:II" To provide students with an advanced understanding of air conditioning and refrigeration

systems, including the design of various systems, advanced refrigeration techniques, and the basics of automatic control. The course focuses on modern refrigeration applications and systems to improve performance and meet the cooling needs in various environments.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Qualifying engineers to meet the needs of the labor market in the mechanical engineering sectors by diversifying learning, teaching and training methods.

أ2- Learn about outside air systems, return air systems, mixed air systems with or without bypass, as well as unitary systems.

أ3- TPiping design, basic system components, types of pumps, pump selection, open and closed piping systems, design principles, pressure loss in the system.

أ4- Promote and develop scientific research in the fields of air conditioning and thermal performance of buildings.

ب- Course specific skill objectives

ب1- Develop basic analysis 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 tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

Description of the academic program with its courses Date of update:

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Air conditioning systems: all outside air systems, return air systems, mixed air systems with or without bypass, unitary systems.

Week 2Piping Systems Design: Piping Network and Basic Components.

Week 3Design of piping systems: valves and expansion tanks, selection of pumps.

Week 4Design of piping systems: open and closed system, direct and reverse circulation system.

Week 5Piping systems design: design method and pressure loss in the system.

Description of the academic program with its courses Date of update:

Week 6Refrigeration: Refrigeration applications, refrigeration methods, properties and types of refrigerants.

Week 7Vapor-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 9Vapor compression refrigeration systems: liquid cooling and vapor bypass, volumetric efficiency.

Week 10:Vapor compression refrigeration systems: performance of basic components (condensers, evaporators, compressors, expansion devices, cooling towers).

Week 11Absorption refrigeration systems: ammonia-water, lithium-bromide, electrolux systems.

Week 12:Vapour jet cooling: vortex tubes, thermoelectric cooling, simple air liquefaction.

Week 13Air circulation refrigeration: closed system, simple open system, system parameters.

Week 14Cold 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

The week:16 Preparatory week before the final exam

Description of the academic program with its courses Date of update:

11-AInfrastructure:

1- Required Textbooks

Jones, W.P., 2007. Air conditioning engineering. Routledge. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inAir conditioning and refrigeration fieldUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**

Description of the academic program with its courses Date of update:

3. **Course Name/Code:Engineering materials failure /Course code: ME424**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe second/StageFourth**
6. **Total number of study hours (30) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

The course "Failure of Engineering Materials" aims to study and understand the scientific and technical basis of failure of materials under different loads. The course covers the mechanical properties of materials, analysis methods for fracture, fatigue, creep, wear and corrosion. The course focuses on how to analyze these phenomena to ensure the safety performance and reliability of materials in engineering applications.

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

أ- **Cognitive objectives**

أ1- Understanding the mechanical properties of materials: Recognize the behavior of materials under stress, including elastic and plastic deformations, and properties of hardness and toughness..

أ2- Understanding Fracture Principles: Study the basic principles of fractures, distinguish between plastic and brittle fractures, and understand the principles of fracture mechanics and fracture testing..

أ3- Understanding Fatigue: Cyclic Stress Analysis, and Curve InterpretationS–N, understanding how cracks initiate and propagate, and factors affecting fatigue life.

أ4- Understanding Creep: Study of general creep behavior, effects of stress and temperature, graphical estimation methods (Larsen-Miller methods), and alloys used in high-temperature applications..

أ5- Understanding corrosion andRust: Analysis of electrochemical considerations, types of corrosion, methods of corrosion prevention, understanding of corrosion andRust.

ب- Course specific skill objectives

ب1- TMechanical Properties Analysis Application: Ability to apply the concepts of deformation and stress and examine the hardness and toughness properties of materials..

ب2- Fracture Analysis: Perform and analyze fracture tests, distinguish between plastic and brittle fractures, and use principles of fracture mechanics..

ب3- Fatigue Assessment: Analysis and Curve AnalysisS–N, fatigue impact factor evaluation, fatigue life estimation of materials.

ب4- Application of creep techniques: Use of creep data estimation methods and their application to alloys used at high temperatures.

ب5- Corrosion management andFor rustApplication 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 tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer.**

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1Mechanical properties: elastic deformation and stress-strain behavior.

Week 2Mechanical properties: elastic and plastic properties of materials, hardness.

Week 3Fractures: Basic principles of fractures, differentiation between plastic and brittle fractures.

Week 4Fractures: Principles of fracture mechanics, fracture testing and impact effects.

Week 5Fatigue: Cyclic stress analysis and S–N curve.

Week 6Fatigue: Initiation and propagation of cracks, factors affecting fatigue life.

Week 7Fatigue: Environmental effects on fatigue lifespan.

Week 8Creep: General creep behavior and effects of stress and temperature.

Week 9Crawling: Methods for estimating crawl data (Larsen-Miller methods).

Week 10Creep: Alloys used in high temperature applications.

Week 11:Corrosion andRustElectrochemical considerations.

Week 12:Corrosion andRustForms of corrosion and methods of corrosion prevention.

Week 13:Corrosion andRust:Erosion andRust- Definition and types.

Week 14:Corrosion andRust:Corrosion analysis andRustAnd the application of prevention strategies.

Week 15Comprehensive review: Review of all major topics, case studies and practical applications.

The week:16 Preparatory week before the final exam

11-AInfrastructure:

1- Required Textbooks

Jones, W.P., 2007. Air conditioning engineering. Routledge. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Description of the academic program with its courses Date of update:

Adding the latest research and technologies inEngineering materials failure field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapterthe second/StageFourth**
6. **Total number of study hours (90) hour**
7. **This description was prepared in February 2025.**
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 mode shapes for transverse vibrations of pegs and strings. They will have the skill to measure and control vibrations and noise.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Apply the basic principles gained from understanding the theory of vibrations.

أ2- Gain skills in dealing with engineering problems and issues related to vibrations.

أ3- Gain a basic understanding of how vibrations occur in various industrial applications.

ب- Course specific skill objectives

ب1- Ability to perform vibration analysis of strings.

ب2- Ability to analyze and process vibrations in columns (shapes).

ب3- Ability to reduce vibration intensity.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems

prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د-General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1-4: Identifying Natural Frequency and Posture Forms,Dunkerley's formula, Holzer's method, and Rayleigh's method.

Week 5: Continuous Systems,Introduction, transverse vibration of rope. examQusayR 1

Week 6: Continuous Systems,Longitudinal vibrations of the stick.

Week 7-8: Continuous Systems,Spiral vibrations of shafts and axles. Midterm exam

Week 9: Controlling Vibrations,Rotary machinery balance.

Week 10: Controlling Vibrations,Rotary axes rotation.

Week 11: Controlling Vibrations,Vibration isolation. examQusayR 2

Week 12: Controlling VibrationsNControl of natural frequencies.

Week 13: Vibration Measurements,Vibration sensors.

Week 14: Vibration Measurements,Vibration exciters.

Week 15: Vibration Measurements,Signal analysis and examinationQusayR 3

The week:16 Preparatory week before the final exam

Weekly lab schedule

Week 1: Lab 1: General Introduction to the Lab.

Week 2-3: Lab 2: One Degree of Freedom System(Simple pendulum).

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 Helical Vibration System.

Week 13-15: Lab 7: Rotation of Axes

11-AInfrastructure:

1- Required Textbooks

1. Theory of Vibration with Application, William T. Thomson. 2nd Edition
2. Mechanics of Machines Elementary Theory and Examples, J. H. Hannah 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(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inThe field of vibration theory andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

1. **Educational Institution: University of Maysan**
2. **Academic Department/Center: Department of Mechanical Engineering**
3. **Course Name/Code:Power stationsII /Course code: ME426**
4. **Available forms of attendance: In-person attendance**
5. **Chapter / Year Chapterthe first/StageFourth**
6. **Total number of study hours (90) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

The course "Power Plants" aims to:II" 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 improving the performance of these systems, in addition to the economic aspects of power plants.

9. Course outcomes, teaching, learning and assessment methods

أ- Cognitive objectives

أ1- Understanding the components of steam power plants: Identify the types of boilers, condensers, steam turbines and their uses..

أ2- Power Plant Component Performance Analysis: Study of how to calculate and analyze the performance of boilers, condensers, and turbines..

أ3- Understanding Hydropower Plants: Hydropower Plant Classification, Hydro Turbine Uses, Understanding Hydropower Calculations.

أ4- Economic Analysis: Identify the economic fundamentals of power plants and estimate costs and returns.

ب- Course specific skill objectives

ب1- Application of boiler concepts: ability to classify boilers, understand their operating principles, and perform boiler performance calculations.

ب2- Capacitor Analysis: Evaluating the performance of capacitors, understanding the design and operation of the different elements in a capacitor.

ب3- Turbine Design: Understanding and designing steam turbines, including analysis of speed diagrams and optimum design of turbine blades..

ب4- Hydropower Calculations: Ability to perform hydropower calculations and analyze the advantages and disadvantages of hydropower plants..

ب5- Economic feasibility analysis: Evaluating the economic aspects of energy projects and estimating costs and economic returns.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer.**

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical and practical.

•ALamFinal exams for the theoretical sideAnd practical.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain 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.

Description of the academic program with its courses Date of update:

Week 2: Steam Power Plant Components (Boilers): Boiler Coils, Equipment and Requirements of a Good Boiler.

Week 3Components of steam power plants (boilers): working principle of fire boilers, tubes and heat recovery.

Week 4: Steam Power Plant Components (Boilers): Boiler Performance Calculations.

Week 5Components of steam power plants (condensers): Types of condensers and elements of a steam condenser.

Week 6:Steam Power Plant Components (Condensers): Air Ejectors and Efficient Condenser Requirements.

Week 7: Components of Steam Power Plants (Condensers): Condenser Performance Analysis.

Week 8: Components of Steam Power Plants (Steam Turbines): Speed Diagrams for Steam Turbines.

Week 9Components of steam power plants (steam turbines): Steam turbines are combined in terms of pressure and speed.

Week 10Components 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 Hydropower Plants: Classification of Hydropower Plants.

Description of the academic program with its courses Date of update:

Week 13: Hydropower Plants: Types of Hydro Turbines and Advantages and Disadvantages of Hydropower Plants.

Week 14: Hydropower Plants: Hydropower Calculations.

Week 15Economic feasibility of power plants: Economic foundations of power plants and estimation of costs and benefits.

The week:16 Preparatory week before the final exam

Weekly lab syllabus

Week 1 and 2: Power Plant Components.

Week 3 and 4: Power Plant Efficiency Evaluation and Simulation Using SoftwareEES.

Week 5 and 6: Steam Turbine Efficiency Evaluation and Simulation Using SoftwareEES.

Week 7 and 8: Gas Turbine Efficiency Evaluation and Simulation Using SoftwareEES.

Week 9: Exam.

Week 10: Nozzles.

Week 11: Capacitor efficiency evaluation and simulation using softwareEES.

Week 12: Boiler efficiency evaluation and simulation using softwareEES.

Week 13: Review.

Week 14: Final Exam.

Week 15: Final exam.

11-AInfrastructure:

1- Required Textbooks

Power plant engineering AKRaja, Amit Prakash, Manish Dwivedi. .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inPower station field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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 achieve.

The model student in case of exploitationNoLearning opportunities available for the course. Must be compared with the program description.

Description of the academic program with its courses Date of update:

1. **Educational Institution: University of Maysan**
2. **Academic 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 Chapterthe second/StageFourth**
6. **Total number of study hours (30) hour**
7. **This description was prepared in February 2025.**
8. **Course objectives:**

The course "Project Management" aims to:Terrific"To provide students with the essential knowledge and skills in project management, from planning and organizing to controlling budgets and managing risks. The course focuses on developing a comprehensive understanding of the fundamentals of project management and how to apply specific tools and techniques to ensure project success.

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

أ- Cognitive objectives

أ1- Understanding the basics of project management: Learn about the concept of project management, its objectives, and the importance of its application in different contexts..

أ2- Project Planning: Understanding How to Use Work Breakdown Structures(WBS) and Gantt charts in project planning.

أ3- Activity Network Analysis: Learn how to estimate project duration using activity networks and critical path analysis.(CPM) and PERT analysis.

أ4- Resource Analysis: Understand how to analyze resource usage using information from the activity network and work breakdown structure..

أ5- Budgets and Cost Control: Learn to estimate project costs, prepare budgets, and analyze benefits and costs..

أ6- net present value(NPV): Understand how to apply net present value in benefit-cost analysis.

أ7- Risk Management: Understand the concept of risk in software/systems projects and learn risk management techniques..

أ8- Project Teams: Understanding Team Dynamics, Motivation, and Defining Roles.

ب- Course specific skill objectives

ب1- Project Planning Tools Application: Ability to use work breakdown structures and Gantt charts to effectively plan projects..

ب2- Activity Network Analysis: Ability to estimate project duration, critical path analysis, and applyPERT.

ب3- Resource management: Analyzing and planning resource usage based on available information..

ب4- Budgeting and Cost Control: Make accurate cost estimates, prepare budgets, and analyze benefits and costs..

ب5- Net Present Value Analysis Application(NPV): Using NPV in project evaluation and financial decision making.

ب6- Risk Management: Applying risk management techniques and analyzing specific risks in projects..

ب7- Project Team Management: Improve team dynamics, motivate members and assign roles effectively.

Teaching and learning methods

Encourage students to participate in the exercises. This is achieved through interactive tutorials and programmers..

Improve and expand critical thinking skills at the same time by considering the type of simple physical examples (prototypes) 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 throughNoTeaching and learning activities. Analytical and problem solving skills It is further developed by a set of problems prepared by lecturers fromNoStudy groups Small and ratedunlessRespond to allunlessFront workers,The course objectives will be delivered through a variety of teaching methods. Presentations will be givenPowerPoint with chapter titles, definitions, charts, and several useful images, plus a summary at the end of each chapter. Offers are offered byPPT 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)

•theExamsQuarterly and final.

ج- **AnoEmotional and value scorer**.

ج1- Attention: Attracting students' attention by implementing one of the application programs on the display screen in the hall.

ج2- Response: Monitoring the student's interaction with the material displayed on the screen.

ج3- Interest: Follow up on the interest of the student who interacted more with the displayed material, by increasing this interaction by requesting other programs and applications to display it.

ج4- Forming an attitude: meaning that the student is sympathetic to the presentation and may have an opinion towards the topic presented and defend it.

ج5- Formation of value-based behavior: meaning that the student reaches the top of the emotional ladder, has a stable level in the lesson, and does not become lazy or restless.

Teaching and learning methods

•Theoretical presentation methodnoUsual using the writing board andunlessDepends on style(How and why)

According to the subject and the curriculum of the subject.

•Theoretical display method using the (show data) device andnoDepends on style(How and why)To the topic

According to the curriculum of the subject.

Evaluation methods

•AnoDirect questions in a way(How and why)For the topic during the theoretical lecture.

•ALamSurprise exams during the theoretical lecture.

•ALamQuarterly exams for the sideTheoretical.

•ALamFinal exams for the theoretical side.

د- **General skillsAnd rehabilitationMovable(Other skills related to employability and personal development)**

د1- Develop student abilityAPerforming duties and delivering them on time.

د2- Logical and programming thinking to find programming solutions to various problems.

د3- Developing the student's ability to dialogue and discuss.

د4- Developing the student's ability to deal with modern technology, especiallyunlessInternet.

د5- Develop teamwork and cooperation skills in solving mathematical and engineering problems.

د6- Enhance the ability to communicate effectively and present mathematical solutions in a clear and convincing manner.

د7- Gain time management and project management skills while working on complex engineering problems.

10. Course structure

Week 1: What is Project Management: An Introduction to the Concept of Project Management.

Week 2Project Planning: Introduction to project planning, use of work breakdown structures (WBS) and the role of Gantt charts.

Week 3: Project Planning: Continue Studying Work Breakdown Structures(WBS) and Gantt charts.

Description of the academic program with its courses Date of update:

Week 4: Activity Network Analysis: Using Activity Networks to Estimate Project Duration.

Week 5: Activity Network Analysis: Using Critical Path Analysis(CPM) and PERT analysis.

Week 6Resource Analysis: Analyze resource usage 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): Application of NPV in cost-benefit analysis.

Week 11: Risk Management: An Introduction to Risk Management in Software/Systems Projects.

Week 12: Risk Management: Risk management techniques and examination of specific risks..

Week 13: Project Teams: Team Dynamics and Motivation.

Week 14Project teams: Team roles and managing relationships between team members.

Week 15: Comprehensive review: Review of all major topics, case studies and practical applications.

The week:16 Preparatory week before the final exam

Description of the academic program with its courses Date of update:

11-AInfrastructure:

1- Required Textbooks

Lectures for Industrial Engineering and Management .1

2-Main References(Sources)

A- Recommended books and references(The fieldAScientific, reports...., websitesNoElectronic sober.

Library locations in some international universities.

B - ReferencesNoElectronic, WebsitesunlessInternet

12. Curriculum Development Plan

Adding the latest research and technologies inProject management field andUse textbooks, scholarly articles, educational videos, and interactive programs.. Include case studies and applied projects that link theory and practice in engineering.. Encourage 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.