Engineering Mathematics **I (ENGE228)**

Fall course	:	**2022**
Credit hour	:	**(2-0-0) 2**
Course web page	:	**https://classroom.google.com**
Class code	:	**Ckioyje**
Pre-requisites	:	**Mathematics II**

Reference Books:

➢ Thomas' Calculus: Early Transcendentals, 13th Edition, Pearson Education, Inc. 2014.

➢ Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, John Wiley & Sons, Inc., 2011.

➢ - Dennis G. Zill, Warren S. Wright, Advanced Engineering Mathematics, 4th Edition, Jones & Bartlett Learning, 2009

Catalog Description:

This course provides students with sufficient mathematical tools and techniques to solve a variety of engineering problems. It is particularly focused on functions of two or more variables. This course covers the following main topics: limits, continuity, partial derivatives and their properties, applications of partial derivatives, chain rule for functions of two or three variables, multiple integrals and their properties, applications of multiple integrals, Fourier analysis, and vector analysis.

Graduate outcomes (GOs) addressed by the course:

i	ii	Iii	iv	v	vi	Vii
✓	✓					

Course Outcomes:

Upon successful completion of the course students will be able to:

1) Understanding the meaning of multivariable functions and how to deal with them.

2) Performing basic mathematical operations on the functions of several variables.

3) Identifying the range and domain of such functions.

4) Evaluating the limits and testing the continuity of this kind of functions.

5) Performing the differentiation on some engineering applications that contain several variables.

6) Applying the multiple integration on multivariable functions and connecting the concept to some engineering applications.

7) Solving basic engineering problems using Fourier series.

Weekly Teaching Plan: October 4, 2022, to January 12, 2023

Week 1	**Introduction to Multivariable Functions**		
	Limits & Continuity of Multivariable Functions		
Week 2	**Partial derivatives** (definitions, functions of more than two variables)		
	Second order partial derivatives		
Week 3	Tutorial sheet No.1		
	Chain rule for functions of two or three variables		
Week 4	Tutorial sheet No.2	Homework 1	Quiz 1
	Maxima and minima and saddle point		
Week 5	Applications of maxima and minima and saddle point		
	Tutorial sheet No.3		
Week 6	1st term Examination		
	Multiple integral (Double integral and its properties)		
Week 7	Double integral over regions and iterated or revised integrals-finding the limits of integration		
	Average Value ,Areas, moments, and center of mass		
Week 8	Double integrals in polar form		
	Integrals in polar coordinates, limits of integration in polar form and changing Cartesian integrals into polar form		
Week 9	Tutorial sheet No.4	Homework 2	Quiz 2
	Triple integrals, properties of triple integrals and evaluation of triple integrals		
Week 10-11	Triple integrals in cylindrical coordinates		

	Applications of Multiple integral
	Tutorial sheet No.5 Homework 3 Quiz 3
Week 12	2nd term Examination
	Fourier analysis (Trigonometric form of Fourier Series Wave form Symmetry and Odd and Even Functions)
Week 13	Half Wave Symmetry, Sum and Shift of function
	Line Spectrum (harmonic) the Fourier Series
Week 14	Complex Exponential form of the Fourier Series
	Fourier Transformation
Week 15	Tutorial sheet No.6 Homework 4 Quiz 4
	Vectors Analysis (Introduction to Vectors: definition, notation and properties)
Week 16	Vector algebra: addition, subtraction, multiplications Vector functions: lines, planes, fields
	Vector differential calculus: derivative, Gradient, Laplacian, divergence, curl.
Week 17	Eigen values, Eigen vectors and Applications
	Tutorial sheet No.7 Homework 5 Quiz 5
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Attendance	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
1st term Exam	10pt	
2nd term Exam	15pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

- Students must be in the classroom on time and bring all subject notes and lectures provided by the teacher.
- Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.
- Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.
- Students should avoid copying and pasting homework.
- Students are encouraged to use internet resources to enrich their knowledge about related topics.

Copy and Paste Policy

The student's work is canceled if the instructor notices any actions of copying and pasting.

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

- All exams will be closed book
- No mobile or programmable calculator is allowed
- Sharing items with other students in the exam is prohibited
- The final exam must be completed to complete the course.

Instructor : Dr. MUYASSAR EDRIS ISMAEEL
Room No. : 108
Email ID : muyassar.alhasso@uomosul.edu.iq

University of Mosul

Mechanical Engineering Department

Co-Instructor : Mrs. Eman M. Ali
Room No.   :
Email ID   : emanmali@uomosul.edu.iq
Last updated : March 2022

THERMODYNAMICS I

MEC201

Spring course	:	**2023**
Credit hour	:	**(2-0-1) 3**
Course web page	:	**https://classroom.google.com**
Class code :	:	keut2nm
Pre-requisites	:	**Physics**

Reference Books:

- ➢ Thermodynamics: An Engineering Approach, By Yunus A. Çengel, Michael A. Boles, Mehmet Kanoğlu, 2019, McGraw-Hill Education, USA.
- ➢ Fundamentals of Engineering Thermodynamics, Michael J. Moran, Howard N. Shapiro, Daisie D. Boettner, Margaret B. Bailey, 2011, Wiley, USA.

Catalog Description:

Thermodynamics remains cornerstone for mechanical engineering students. For this reason, the department of Mechanical Engineering has offered two thermodynamic courses to ensure that ME student are given enough time to cover the fundamental concepts of thermodynamics. In general, the ME201 covers the important vocabulary and definitions of energy (of various forms), heat, work, control volume, thermodynamics processes and cycles. In this course, student will apply the principle of energy conservation and first law of thermodynamic on control volume of open and closed system.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓		✓	✓		

Course Outcomes:

The objectives of this course are to learn about the following concepts and their applications to real world engineering systems

1) Identify the terminology and definitions associated with thermodynamics, review unit system, properties of a system such as density, pressure, temperature and specific heats.

2) Introduce a systematic step for solving thermodynamic problems.

3) Understand the concept of energy and the definition of its various types, especially, internal energy of a system.

4) understand the concept of heat and the way energy transfer by heat

5) Define the concept of work.

6) Introduce the first law of thermodynamics and energy balance.

7) Define a control volume principle, including the transfer of mass and energy crossing the control surface

8) Understand the concept of a pure substance, phase change, and projection of substance property line on PV, TV, and PT property diagram.

9) Demonstrate the procedures for determining thermodynamic properties of pure substances from tables of property data.

10) Define the hypothetical ideal gas, and demonstrate the ideal-gas equation of state as well as the deviation from ideal gas behavior through compressibility factor.

11) Apply the first law of thermodynamics on closed (fixed mass) system and develop the general energy balance applied to closed systems.

12) Define the specific heats at constant volume and pressure and relate them to the changes in internal energy and enthalpy of ideal gases. Also, determine the internal energy and enthalpy for incompressible substances.

13) Apply energy balance for closed (fixed-mass) systems that involve heat and work interactions for pure substances, ideal gases, and incompressible substances.

14) Apply mass conservation principle to various systems including steady and unsteady flow control volumes.

15) Identify the energy carried by a flow stream crossing a control surface as the sum of internal energy, flow work, kinetic energy, and potential energy of the fluid and to relate the combination of the internal energy and the flow work to the property enthalpy.

16) Solve energy balance problems for common steady-flow devices such as nozzles, compressors, turbines, throttling valves, mixing chambers, and heat exchangers.

17) Introduce the second law of thermodynamics and identify valid processes as those that satisfy both the first and second laws of thermodynamics.

18) Define and thermal energy reservoirs, reversible and irreversible processes, and introduce the heat engines, refrigerators, and heat pumps.

19) Apply the second law of thermodynamics to theoretical cycles and develop absolute thermodynamic temperature scale.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1-2	Introduction, concept, and definitions		
Week 3-4	Energy, heat, work, first law of thermodynamics		
	Tutorial sheet No.1	Homework 1	Quiz
Week 5-7	Properties of Pure Substances, Property Tables, Ideal Gases, Real Gases, Compressibility Ratio.		
	Tutorial sheet No.2	Homework 2	Quiz
Week 8	Mid-Term Exam		
Week 9	Mass and energy analysis of control volumes, steady- and unsteady flow, chambers, and heat exchangers.		
	1st term Examination		
Week 10-11	Energy balance problems such as nozzles, compressors, turbines, throttling valves, mixing		
	Tutorial sheet No.4	Homework 4	Quiz
Week 12 -15	The second law of thermodynamics, thermal energy reservoirs, reversible and irreversible processes,		
	Tutorial sheet No.5	Homework 5	Quiz
Week 16-17	Heat engines, refrigerators, and heat pumps, Carnot cycle.		
	2nd term Examination		
Final Exam			

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Attendance	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Participation	5pt	
1st term Exam	10pt	
2nd term Exam	15pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

➢ Students must be in the classroom on time and bring all subject notes and lectures provided by the teacher.

➢ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➢ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➢ Students should avoid copying and pasting homework.

➢ Students are encouraged to use internet resources to enrich their knowledge about thermodynamic topics.

Copy and Paste Policy

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Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

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Mechanical Engineering Department

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Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

- ➢ All exams will be closed book
- ➢ No mobile or programmable calculator is allowed
- ➢ Sharing items with other students in the exam is prohibited
- ➢ The final exam must be completed to complete the course.

Instructor: Dr. Younis Najim

Room No.: 202

Email: mahalyounis@uomosul.edu.iq

Assessment tools for MEC201								
		ملاحظات	i	ii	iv	v	SUM	نسبة النجاح
Home works	5pt							
HW1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الواجب ؟		■				
HW2	1pt			■				
HW3	1pt				■			
HW4	1pt				■			
HW5	1pt					■		

Quizzes	5pt									
Q1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الامتحان القصير ؟								
Q2	1pt									
Q3	1pt									
Q4	1pt									
Q5	1pt									
1st term Exam	10pt	ما المحصل التعليمي المستهدف تحقيقه؟								
2nd term Exam	15pt									
Final Exam	60pt									
Participation+ Attendance	5 pt									
Total	100pt									

Mechanics of Materials I
MEC202

Academic Year	:	**Sept.2022**
Credit Hour	:	**(3-3-0) 3**
Course web page	:	**https://classroom.google.com**
		Class code : crxx2b3
Pre-requisites	:	Physical Science and Engineering Mechanics concepts

Catalog Description:

The study of mechanics of materials is the study of the behaviour of solid bodies under load. The way in which they react to applied forces, the deflections resulting and the stresses and strains set up within the bodies are all considered in an attempt to provide sufficient knowledge to enable any component to be designed such that it will not fail within its service life. Typical components considered in detail in this volume include beams, shafts, cylinders, struts, diaphragms and springs and, in most simple loading cases, theoretical expressions are derived to cover the mechanical behaviour of these components. Because of the reliance of such expressions on certain basic assumptions, the text also includes a chapter devoted to the important experimental stress and strain measurement techniques in use today with recommendations for further reading.

Reference Book:

o E. J. Hearn. "Mechanics of Materials 1: (Strength of Materials), An Introduction to elastic and plastic deformation of solids and structural materials ", 3rd edition or any new edition. (Can be downloaded from the Course web page).

o R. C. Hibbeler. "Strength of Materials". 12th edition or any new edition 2012. (Can be downloaded from the Course web page).

o Any other references such as Singer, Pytel, Timoshenko, Rattan… Etc.

o Magazines and review (Internet): Any website related to the mechanics or Strength of Materials.

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Course Outcomes:

Mechanics of materials (Strength of Materials) is a branch of applied mechanics that deals with the behaviour of solid bodies subjected to various types of loading and give the ability to calculate stresses, strains, shear stresses, shear strains, deformations, ... etc of objects under

external loadings, as well as give the ability to increase the knowledge of strength of materials on engineering design and their applications.

Student learning outcome:

1) An ability to apply knowledge of science and engineering in Mechanics of Materials (strength of materials) fields.

2) An ability to design and conduct experiments, as well as to analyze and interpret data.

3) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

4) An ability to function on multi-disciplinary teams.

5) An ability to identify, formulates, and solves engineering mechanics problems.

Weekly Teaching Plan:

Week 1	**Introduction- Strength of Materials.**
	Introduction; syllabus; Classification of engineering mechanics; Definition of mechanics of materials; Why do we study mechanics of materials; classification of materials properties; Mechanical properties of the materials; Tensile test; Hardness; Impact test; creeping; Fatigue and Fatigue limit.
Week 2&3	**Simple Stresses and Strains. Thermal Stresses.**
	Introduction; Normal (Direct) stress; Direct strain; Sign convention for direct stress and strain; Bearing stress; Elastic materials Hook's law); Modulus of elasticity (Young Modulus); Tensile test; Ductile and Brittle materials; Poisson's ratio; Application of Poisson's ratio to a two dimensional stress system; Shear stress and shear strain; Allowable Working Stress – Factor of Safety; Temperature stress. Problems.
	First Quiz
Week 4&5	**Compound Bars.**
	Introduction; Statically determinate and statically indeterminate systems; Compound bar subjected to external load; Equivalent or combined modulus; Compound bar subjected to temperature change; Problems.
	Second Quiz
Week 6&7	**Shearing Force and Bending Moment Diagrams.**
	Introduction; What is a beam; Beam types; Shear force and bending moment definitions; shear force and bending moment sign conventions; Types of loading beams; S.F. and B.M. diagrams for beams carrying concentrated loads only; S.F. and B.M. diagrams for uniformly distributed loads (u.d.l.); S.F. and B.M. diagrams for combined concentrated and uniformly distributed loads (u.d.l.); Point of Contraflexure; Relationship between S.F. and B.M. and intensity of loading; S.F. and

	B.M. diagrams for an applied couple or moment; S.F. and B.M. diagrams for inclined loads; Problems.	
	<mark>Third Quiz</mark>	
Week 8&9	**Bending.**	
	Introduction; Simple bending theory; Neutral axis; Section modulus; Second moment of area; Combined bending and direct stress ; Shear stresses owing to bending; Limitations of the simple bending theory; Problems.	
	<mark>Forth Quiz</mark>	
Week 10&11	**Shear stress distribution.**	
	Introduction; Distribution of shear stress due to bending; Application to rectangular sections; Application to I-section beams; Vertical shear in the web; Vertical shear in the flanges; Horizontal shear in the flanges; Application to circular sections; Limitation of shear stress distribution theory; Shear centre; Problems.	
	<mark>Fifth Quiz</mark>	
Week 12&13	**Torsion.**	
	Introduction; Simple torsion theory; ; Polar second moment of area; Shear stress and shear strain in shafts; Section modulus; Torsional rigidity; Torsion of hollow shafts; Torsion of thin-walled tubes; Composite shafts -series connection; Composite shafts -parallel connection; Power transmitted by shafts; Problems.	
	<mark>Sixth Quiz</mark>	
Week 14		
	1st Term Examination	

Students Behavior in Class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).

- Do not speak to your friends during the lectures. If you have a question about the material, please raise your hand to ask the instructor.

- Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do

not use electronic devices to access games, Facebook, twitter or other non-related course material.

- If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.

- Don't ask the instructor about the following:

    1. Exam question patterns

    2. Increase your grade or letter

    3. Postpone exam or extend the due dates (deadlines) for submission projects and homework.

Failure to meet behavioral expectations ma y results in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark=Work Mark / No. of coping students)

Email Policy

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

Computer Usage:

Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site.

Teaching Techniques:

Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students.

Grading Policy:

Students Attendance	2pt
Select higher quizzes	8pt
1st term Exam	15pt
2nd term Exam	15pt
Overall	40pt
Final Exam	60pt
Total	100pt

Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".

Exam Policy

- o All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
- o No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
- o The final exam must be completed in order to complete the course.
- o Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
- o Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.

Instructor   : Dr. Anas Obeed Balod
Room No.   : 308
Email ID   : anasbalod@uomosul.edu.iq
Last updated   : October 2022

Co-Instructor   : Mr. Omar A. Mohammed
Room No.   ; New Building
Email ID   : omaralbdulrahman@uomosul.edu.iq

University of Mosul

Mechanical Engineering Department

FLUID MECHANICS I

	1. تفاصيل المقرر

MEC203

Spring course	:	**2023**
Credit hour	:	**(2-0-2) 4**
Course web page	:	**https://classroom.google.com**
Class code:	:	
Pre-requisites	:	**Fluid Mechanics**

Reference Books:

➢ Elementary Fluid Mechanics Vennard and Street. 6thedition, 1982.

➢ Fluid Mechanics 5th edition Frank M. White. 1999.

➢ Bruce R. Munson, Donald F. Young and Theodore H. Okiishi, 2002. "Fundamentals of Fluid Mechanics"

Catalog Description:

	2. وصف عام المقرر

An introduction to the fundamental of fluid mechanics, basic concepts and applications (Units, density, compressibility, elasticity, viscosity, surface tension, capillarity, vapor pressure & cavitations), Pressure applications and measurements, Forces on immersed bodies and surfaces, Fluid subjected to Rotation & linear acceleration, Introduction to fluid motion – basic concepts, Conservation of mass, continuity equation, Equations of motions- Euler's, Bernoulli's, and work-energy equations for the flow of ideal fluid; and their applications, Impulse - Momentum principles and applications, Pipe fittings, propellers, and impulse turbines, Similitude and Dimensional analysis, Flow of real fluids – basic concepts of external, internal, laminar and turbulent flow; definition of boundary layer, Friction losses in pipes.

	3. محصلات الخريجين المستهدفة في المقرر. يرجى الاطلاع على الملحق

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓		✓	✓		

University of Mosul

Mechanical Engineering Department

Course Outcomes:

Students who study fluid mechanics will be able to:
1. Classify the fluid properties *(*compressibility, elasticity, viscosity, surface tension, capillarity*)*.
2. Measure pressure by all types of manometers.
3. Calculate the forces on the immersed bodies and surfaces.
4. Analyze the fluid when subjected to Rotation & linear acceleration.
5. Apply Conservation of mass, continuity equation, Equations of motions- Euler's, Bernoulli's, and work-energy equations.
6. Apply Impulse - Momentum principles and applications.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1	An introduction to the fundamental of fluid mechanics, basic concepts and applications		
Week 2	Compressibility and elasticity		
Week 3-4	viscosity		
	Tutorial sheet No.1	Homework 1	Quiz
Week 5	surface tension, capillarity, vapor pressure		
Week 6	Pressure applications and measurements		
Week 7-8	Forces on immersed bodies - plane surfaces		
	Tutorial sheet No.2	Homework 2	Examine1
Week 9-10	Forces on immersed bodies - curved surfaces		
	Tutorial sheet No.3	Homework 3	Quiz
Week 11	Introduction to fluid motion – basic concepts, Conservation of mass		
Week 12-13	Equations of motions- Euler's and Bernoulli's		
	Tutorial sheet No.4	Homework 4	Quiz
Week 14-15	Work-Energy Equations		
	Tutorial sheet No.5	Homework 5	Examine 2
Final Exam			

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Attendance	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero-attendance mark.
Participation	5pt	
Exam1	10pt	
Exam2	10pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

➤ Students must be in the classroom on time and bring all subject notes and lectures provided by the teacher.

➤ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➤ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➤ Students should avoid copying and pasting homework.

➤ Students are encouraged to use internet resources to enrich their knowledge about vibration topics.

Copy and Paste Policy

The student's work is canceled if the instructor notices any actions of copying and pasting.

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

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Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

- ➢ All exams will be closed book
- ➢ No mobile or programmable calculator is allowed
- ➢ Sharing items with other students in the exam is prohibited
- ➢ The final exam must be completed to complete the course.

Instructor: Dr. Taha Ahmed

Room No.: 105

Email: tahatahamir100@uomosul.edu

Mechanical Drawing

MEC 204

Autumn course	:	**2022-2023**
Credit Hour	:	**(0-3-0) 1**
Course web page	:	**https://classroom.google.com**
Class code :	:	**peyqukc**
Pre-requisites	:	**Computer Aided Drawing**

Reference Book:

➢ Engineering Drawing and Design, David A. Madsen, 1989.

➢ Mechanical Drawing Board & CAD Techniques, Student Edition, McGraw-Hill Education, 1997.

➢ Machine drawing, R.K.DHAWAN. 2008.

Catalog Description:

Study of detail drawings with dimensioning and tolerances, sectioning techniques, orthographic projection, and pictorial drawings. Topics covered include: Geometric Dimensioning and tolerance techniques, the dimensioning standard, pictorial drawings, auxiliary views, sections, fasteners, and the creation of assembly and detail drawings. Introduce students to the principals of mechanical drawing employing Computer-Aided-Drafting techniques.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓	✓				

Course Outcomes:

Upon successful completion of this course, students will be able to

1) Study of detail drawings with dimensioning and tolerances, sectioning techniques, orthographic projection, and pictorial drawings. Topics covered include: Geometric Dimensioning and tolerance techniques, the dimensioning standard, pictorial drawings, auxiliary views, sections, fasteners, and the creation of assembly and detail drawings.

2) Prepare free-hand multiview sketches of objects assigned by the instructor.

3) Create and insert symbols.

4) Specify and depict threads, fasteners and other hardware in a mechanical assembly.

5) Plot assembly drawings with certan scales.

6) Design and document a consumer product (as defined by the instructor) that follows the classical design model (problem identification, ideation, analysis and refinement, decision and implementation) from conception through working drawings.

Weekly Teaching Plan: October 2, 2022, to January 12, 2023

Week 1	Introduction; syllabus; lines, section, views, dimension and the students will draw a class work and take a home work
Week 2-3	Permanent fastening; Permanent fastening is a hardware device that mechanically joins or affixes two or more objects together
	Quiz
Week 4-5	Temporary fastening; Temporary fastening are any fastener that is considered to create a temporary joint. The biggest most common example is a hex cap screw and nuts
Week 6-7	Tolerances and Fit; Tolerances and Fit In mechanical engineering, limits and fits are a set of rules regarding the dimensions and tolerances of mating machined parts if they are to achieve the desired ease of assembly, and security after assembly - sliding fit, interference fit, rotating fit, non-sliding fit, loose fit, etc, and the students will draw a class work and take a home work
	1st term Examination
Week 8	Couplings; Couplings are a device used to connect two shafts together at their ends for the purpose of transmitting power. Couplings do not normally allow disconnection of shafts during operation
Week 9-10	Bearings; Bearings are a device used to connect two shafts together at their ends for

	the purpose of transmitting power. Couplings do not normally allow disconnection of shafts during operation
	Quiz
Week 11-13	Coupler joint; Coupler joint is the most commonly used form of pipe joint. it is formed but a small piece of pipe known as socket
Week 14	Assembly drawings; Assembly drawings can be used to represent items that consist of more than one component
Week 15	Valve; A valve is a device that regulates, directs or controls the flow of a fluid by opening, closing, or partially obstructing various passageways and the students will draw a class work and take a home work
	2nd term Examination
Final Exam	

Grading Policy:

Home works	10pt	
Classworks	8pt	
Quizzes	8pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
1st term Exam	12pt	
2nd term Exam	12pt	
Final Exam	50pt	
Total	100pt	

Students' behavior in Class

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➢ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➢ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➢ Students should avoid copying and pasting homework.

> ➢ Students are encouraged to use internet resources to enrich their knowledge about vibration topics.

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Classroom:

Time: TBD.

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The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

> ➢ All exams will be closed book
> ➢ No mobile or programmable calculator is allowed
> ➢ Sharing items with other students in the exam is prohibited
> ➢ The final exam must be completed to complete the course.

Instructor: Dr. Ahmed Khalid

Room No.: E 108

Email: alnajar.ahmed9@uomosul.edu.iq

Co-Instructor : Ghaydaa Ibrahim

Room No. : E 106

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Co-Instructor: Emad Hazem

Room No.: E 104

Email ID: emades2004@yahoo.com

Mosul University

College of Engineering

Physics for Engineers
MEC 205

Academic Year	:	**2021-2022 Full**
Credit Hour	:	**(3 – 0 – 0) 3**
Course web page	:	**Classroom: https://classroom.google.com**
		Classroom code : avkc6yt
		Google Meet: https://meet.google.com/
Pre-requisites	:	Physical Science and Engineering Mechanics concepts

Catalog Description:

Physics, the most fundamental physical science, is concerned with the fundamental principles of the Universe. It is the foundation upon which the other sciences astronomy, biology, chemistry, and geology—are based. It is also the basis of a large number of engineering applications. The beauty of physics lies in the simplicity of its fundamental principles and in the manner in which just a small number of concepts and models can alter and expand our view of the world around us. The course objects demonstrates the continue sequence in physics for students intending to major in a field of mechanical and mechatronics engineering. Calculus will be used as needed and should be taken at least concurrently.

Topics included in this course divided into three chapters as:

Chapter One:
Physics and Measurement, Standards of Length, Mass, and Time, Matter and Model Building, Density and Atomic Mass, Dimensional Analysis, Conversion of Units, Estimates and Order-of-Magnitude Calculations, Significant Figures.

Chapter Two:
Motion in One Dimension, Position, Velocity, and Speed, Instantaneous Velocity and Speed, Acceleration, Motion Diagrams, One-Dimensional Motion with Constant Acceleration, Freely Falling Objects, And Kinematic Equations Derived from Calculus, General Problem-Solving Strategy.

Chapter Three:
Vectors, Coordinate Systems, Vector and Scalar Quantities, Some Properties of Vectors, Components of a Vector and Unit Vectors.

Chapter Four:

Motion in Two Dimensions, The Position, Velocity, and Acceleration Vectors, Two-Dimensional Motion with Constant Acceleration, Projectile Motion, Uniform Circular Motion, Tangential and Radial Acceleration, Relative Velocity and Relative Acceleration.

Chapter Five:

The Laws of Motion, the Concept of Force, Newton's First Law and Inertial Frames, Mass, Newton's Second Law, The Gravitational Force and Weight. Newton's Third Law, Some Applications of Newton's Laws, Forces of Friction.

Chapter Six:

Circular Motion and Other Applications of Newton's Laws, Newton's Second Law Applied to Uniform Circular Motion, Non uniform Circular Motion, Motion in Accelerated Frames, Motion in the Presence of Resistive Forces, Numerical Modeling in Particle Dynamics.

References:

1- Physics for Scientists and Engineers with Modern Physics By: Raymond A. Serway John W. Jewett, Jr.
2- Physics for Scientists and Engineers with modern physics. Raymond A. Serway and John W. Jewett. 9th edition, 2014.
3- Fundamentals of Physics. David Halliday, Robert Resnick and Jearl Walker. 10th edition, 2014.
4- Engineering Mechanics: Dynamics - Volume 2. J.L. Meriam, L.G. Kraige and J. N. Bolton. 8th edition, 2015.
5- Physics of Radiation and Climate; Michael A. Box, Gail P. Box; CRC Press, 2015.
6- Physics for Engineers and Scientists Third Edition Hans C. Ohanian, John Markett, Academic Year.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓	✓	✓	✓		

Course Outcomes:

Students who study principles of physics will be able to

1- State SI units, and write the units and their abbreviations correctly;(i)

2- Gain a knowledge and understanding of fundamental physical concepts in the areas covered in this class.(i)

3- Apply an understanding of these concepts to various systems and devises.(ii)

4- Acquire problem solving skills, mathematical techniques, and the ability to synthesize.(iii)

5- Develop a conceptual understanding of the fundamental physical principles described above.(ii, iii)

6- Recognize the relationship between the conceptual description of nature and its mathematical expression.(iv)

7- Develop the mathematical description of these principles that can be used to develop devices, structures, and technologies that are useful for mankind.(v)

8- Use the mathematical description of these principles to develop problem solving skills that will benefit your future career.(iv, v)

Weekly Teaching Plan:

Week 1,2	Physics and Measurement, Standards of Length, Mass, and Time, Matter and Model Building, Density and Atomic Mass, Dimensional Analysis, Conversion of Units, Estimates and Order-of-Magnitude Calculations, Significant Figures. (Tutorial sheet No.1) H.W1
Week 3,4,5	Motion in One Dimension, Position, Velocity, and Speed, Instantaneous Velocity and Speed, Acceleration, Motion Diagrams, One-Dimensional Motion with Constant Acceleration, Freely Falling Objects, And Kinematic Equations Derived from Calculus, General Problem-Solving Strategy. (Tutorial sheet No.2) H.W2
Week 6,7,8	Vectors, Coordinate Systems, Vector and Scalar Quantities, Some Properties of Vectors, Components of a Vector and Unit Vectors. (Tutorial sheet No.3) H.W3
First Quiz	
Week 9,10	Motion in Two Dimensions, The Position, Velocity, and Acceleration Vectors, Two-Dimensional Motion with Constant Acceleration, Projectile Motion, Uniform Circular Motion, Tangential and Radial Acceleration, Relative Velocity and Relative Acceleration. (Tutorial sheet No.4) H.W4
Week 11,12	The Laws of Motion, the Concept of Force, Newton's First Law and Inertial Frames, Mass, Newton's Second Law, The Gravitational Force and Weight. Newton's Third Law, Some Applications of Newton's Laws, Forces of Friction. (Tutorial sheet No.5) H.W5

Week 13,14,15	Circular Motion and Other Applications of Newton's Laws, Newton's Second Law Applied to Uniform Circular Motion, Non uniform Circular Motion, Motion in Accelerated Frames, Motion in the Presence of Resistive Forces, Numerical Modeling in Particle Dynamics. (Tutorial sheet No.6) H.W6

<div align="center">Third Quiz</div>

<div align="center">**Final Exam**</div>

Students Behavior in Class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- Student must be in class room on time and should bring all subject notes, all tables provided by the teacher.

- Student are not allowed to talk to other students during the lecture. All speech should directed to the lecturer.

-     Students' mobile must be on off mode, no permission can be given by the lecturer to the student to receive mobile calls.

- Students should avoid copy and paste homework, if so all student done that would get zero degrees.

- Students are encouraged to use internet, Google classroom, you tube, looking for similar topics which may help them to get more knowledge.
- Don't ask the instructor about the following:

  1. Exam question patterns

  2. Increase your grade or letter

  3. Postpone exam or extend the due dates (deadlines) for submission homework.

Copy and Paste Policy

Students should avoid copying and pasting jobs for their home works and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark = (Work Mark / No. of coping students).

Email Policy

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

Teaching Techniques:

Power point presentation and multimedia tools are used in classrooms; Examples and

problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students.

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Attendance	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Participation	5pt	
1st term Exam	10pt	
2nd term Exam	10pt	
Final Exam	60pt	
Total	100pt	

Exams policy

- o All exams will be closed book
- o All tables and schedules must be brought by students
- o No mobile or programmable calculator are allowed
- o Sharing items with other students in exam are prohibited
- o The final exam must be completed in order to complete the course.
- o Four Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.

Instructor : **Dr. Ziad Shakeeb Al Sarraf (Lecturer)**

Room No. : **309 (Mechanical Engineering Department)**

E-mail ID : **ziadalsarraf@uomosul.edu.iq**

: **ziadalsarraf1975@gmail.com**

1st Co-Instructor : **Mr. Majid Medhat Saeed (Assistant Lecturer)**

Room No. ; **108 (Mechanical Engineering Department)**

Email ID : **majidmedhat@uomosul.edu.iq**

Mosul University

Mechanical Engineering Department

Engineering Mechanics 'DYNAMICS'1
ME206

Academic Year	:	2022-2023 Spring Term
Credit Hour	:	(2-0-1) 4
Course type	:	required
Course web page	:	Google classroom (rezzjeo)
Instructor	:	Bakr Noori Alhasan
Instructor e-mail	:	bakralhasan@uomosul.edu.iq
Pre-requisites	:	Engineering Mechanics I STATICS
Pre-requisites	:	Engineering Mechanics 'STATICS'

Catalog Description:

The objective of this course is to present the basic principles of dynamics and help to develop proficiency in applying these principles to formulate and solve dynamics problems. The students are expected to build upon previously acquired skills in mathematics and physics to solve practical problems of Dynamics. The course objectives are

Apply a general analysis approach to solving kinematics problems; define and calculate the displacement, distance, velocity and acceleration for particles in rectilinear and curvilinear motion. Define and calculate the linear and angular velocities and accelerations for systems of 2D rigid bodies in translation, rotation about a fixed axis, and general planar motion.

Kinetics problems: Solve 2D kinetics problems using force-acceleration, work-energy and impulse-momentum methods. Calculate the mass moment of inertia (about the center of mass and about a point other than the center of mass).

Text Book: Engineering Mechanics "Dynamics"

J.L. Meriam and L.D. Kraige   5th ed.

References:

1. Engineering Mechanics 'Dynamics"

R. C. Hibbeler

2. Engineering Mechanics Dynamics

Andrew Pyel and Jan Kiwsalaas

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓					✓

Course Outcomes (CLOs)

Learning outcomes, after completion of the course the student should be able to:

Describe and calculate the motion (position, velocity, acceleration) for particles and solids in plane motion.

Apply free-body diagrams and solve Newtons second law for plane problems.

Describe and explain kinetic energy, potential energy and work. Solve dynamical problems using these concepts.

Apply linear and angular momentum for particles and solids in plane motion.

Explain and calculate the moment of inertia for simple solids.

Fundamentals of Engineering Exam (FE)

One of the objectives of this course is to prepare the students for the FE Exam.

Therefore, in certain assignments you will be required to use the FE Handbook. FE includes questions in the following areas related to Dynamics

Linear motion (e.g., force, mass, acceleration, momentum),

Angular motion (e.g., torque, inertia, acceleration, momentum),

Mass moment of inertia,

Impulse and momentum applied to particles and rigid bodies,

Work, energy, and power applied to particles and rigid bodies,

Weekly Teaching Plan

Week 1 Oct.	Ch.1 Introduction to Dynamics
Week 2	Ch.2 Kinematics of Particles, Rectilinear Motion
Quiz 1	
Week 3	Plane Curvilinear Motion, Rectangular Coordinates (x-y)
Week 4	Normal and Tangential Coordinates (n-t)
Week 5	Polar Coordinates (r-Theta)
Week 6	Relative Motion (Translating axes)
Quiz 2	
Week 7, 8	Ch.3 Plane Kinetics of Particles Direct Application of Newton's second Law (Force, Mass, and Acceleration): Rectilinear and Curvilinear Motion
Week 9	Work and Kinetic Energy
Quiz 3	

Week 10	Impulse and Momentum (Linear)
Week 11	Mid Term Examination
Week 12	Ch.5 Plane Kinetics of Rigid Bodies: Rotation
Week 13	Relative Velocity
Quiz 4	
Week 14	Ch.6 Plane Kinetics of Rigid Bodies: direct application of Newton's second Law: Translation
Week 15	Appendix B. Mass Moment of Inertia
Quiz 5	
Final Examination	

Grading Policy:

Five Quizzes (each 2.0 Marks)	10 Marks
Project and homework	10 Marks
Mid Term Exam	20 Marks
Final Exam	60 Marks
Total	100 Marks

TATISTICS

ENGC227

Spring course	:	**2023**
Credit hour	:	**(2-0-0) 2**
Course web page	:	**https://classroom.google.com**
Class code :	:	Pr4ccik
Pre-requisites	:	Fundamentals of Statistics

Reference Books:

1-"Elementary statistics",Ron Larson,5th edition,Prentic Hall,Boston,2012.(Text book).
2-"Introduction to statistics and data analysis",Roxy Peck,3rd edition,Thomson Brooks,2008,USA.

Catalog Description:

This course provides the basic terms in statistics types of statistics (descriptive and inferential), Frequency distribution table, measures of central tendency, probability theory, rules of probability, conditional probability ,Bayes theorem, permutation and combination, definition Poisson distribution), continuous probability distribution :normal distribution area under the curve of normal distribution, test of hypothesis, hypothesis test of the mean with unknown and and classification of random variable, discrete probability distribution(Binomial and known population variance, the principles design of experiments ,one and two way ANOVA.

Graduate outcomes (GOs) addressed by the course:

i	ii	Iii	iv	v	vi	vii
✓		✓	✓	✓	✓	

Course Outcomes:

Upon successful completion of this course, students will be able to

1) Analysis data and conversion from unclassified data to classified data (i).
2) Exemplifying data in form of tables , graphics and charts (ii).
3) Describing histogram frequency distribution, data limits, data tabulation, polygon, (i,iv).
4) Using definition of conditional probability and their properties (iv,v).
5) Understand multiplication rule, total probability theorem, Bayes theorem (ii).
6) Explaining and classification of random variable (discrete and continuous), (ii,v).

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1	Introduction to engineering statistics ,types of statistics(descriptive and inferential),Basic terms in statistics (data, population and sample).
Week 2	Frequency distribution table (creating, graphical representation),types of graphs(histogram, polygon and ogive).
	Homework 1 Quiz NO.1
Week 3	Basic concepts of probability theory (random events and sample space), Sets and probabilistic models, axioms of probability.
Week 4	Rules of probability ,addition and multiplication rule, two events and three events(mutually and non-mutually events).
Week 5	Conditional probability ,Bayes theorem.
	Homework 2 Quiz NO.2
Week 6	Permutation and combination ,Tree diagram probability
Week 7	Definition and classification of random variable(continuous and discrete),types of discrete distribution.
Week 8	Discrete probability distribution(Binomial and Poisson distribution).
	Homework 3 Quiz NO.3
Week 9	Continous probability distribution :normal distribution, properties of normal distribution, Area under the curve of normal distribution.
	1st term Examination
Week 10	normal distribution relation between binomial and normal distribution.Continous probability distribution: Transformation from normal distribution to standard

Week 11	Test of hypothesis, Types of errors in hypothesis testing,The steps of hypothesis test
	Homework 4 Quiz NO.4
Week 12	Hypothesis test of the mean with unknown population variance.
Week 13	Hypothesis test of two means with known population variance.
Week 14	The principles design of experiments ,one and two way ANOVA.
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Attendance	5pt	
Participation	5pt	
1st term Exam	20pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

- Students must be in the classroom on time and bring all subject notes and lectures provided by the teacher.
- Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.
- Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.
- Students should avoid copying and pasting homework.
- Students are encouraged to use internet resources to enrich their knowledge about vibration topics.

Copy and Paste Policy

The student's work is canceled if the instructor notices any actions of copying and pasting.

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

- ➢ All exams will be closed book
- ➢ No mobile or programmable calculator is allowed
- ➢ Sharing items with other students in the exam is prohibited
- ➢ The final exam must be completed to complete the course.

Instructor: Ghaidaa Ibraheem Hsaen Alsarraj

Room No.: 106

Email: ghaidaa.alsarraj2019@uomosul.edu.iq

Engineering Mathematics II

ENG230

Academic Year : 2022-2023 Spring

Credit Hour : (2-0-1) 3

Course web page : https/ classroom.google.com

Course Description:

This course gives the students the ability to solve and investigate the differential equation using different methods, all types of differential equations will covered (first order and second order , linear and non-linear) , in doing so, the student will gain an advantage for the next courses in that some signal processing and control system problem that will be easier to solve. Also, the Laplace transform can be analyzed and more information about this transform can be gained and investigated.

References:

1- Advanced Engineering Mathematics, DIFFERENTIAL EQUATIONS with Boundary-Value Problems a Zill Cullen-Zill-6rd-Edition-Solutions, 2018.
2- Calculus By Thomas Finny 13th Edition, Person Publisher,2016.

Mosul University

Mechanical Engineering Department

Course Details:

Subject	week
Definition and Classification of differential equation DE (ordinary and partial, order, degree, Linear and non-linear)	1
Solution of differential equations (general solution)	2
Solution of differential equations (particular solution)	3
First order ordinary DEs (Linear)	4
First order ordinary DEs (separable homogeneous)	5
First order ordinary DEs (exact, non-homogeneous)	6
Second order ordinary DEs (Linear Second order DEs with constant coefficients)	7
Second order ordinary DEs (Undetermined coefficient method)	8
Second order ordinary DEs (Variable of parameter method, Second order DEs with variable coefficients)	9
Application of second order ordinary differential equations	10
Laplace transform properties and application, Laplace Inverse Transform, Laplace transform of unite step function	11
Laplace Inverse Transform of unit step function	12
First Shifting theorem (Translation in S- domain)	13
Second Shifting theorem (Translation in Time)Convolution Theorem	14
Solution of Differential Equations by Laplace Transformation	15
Final Exam	---

Mosul University

Mechanical Engineering Department

Students Behavior in Class:

As the classes are held online and lectures are delivered live where student must be present while teacher is delivering the lecture, it is obligatory to adhere to the following rules:

- Join the live lecture on time and mute your mike, turn off your camera, and avoid distracting others>
- Use the discussion and chat section only for recording your attendance and the relevant questions about the lecture content.
- Be aware that both the Google Meet and Classroom are not social media, so consider the university ethics and follow the formal instructions.
- Do not use the class stream for resisting the course plan, encouraging strike, or confusing others.
- If you have a specific question, use the privet comments to discuss that with the course instructors. That makes it easy for us to follow your concerns case by case.
- Submit assignments, quizzes, and evaluations tests by the due date.

Failure to meet behavioral expectations may lead to dismissal form the classroom.

Email policy:

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, after the main lecture or via Google classroom.

Mosul University

Mechanical Engineering Department

Teaching Techniques:

We do our best to minimize the difference between the distance learning and traditional in class counterpart. Lecture notes and examples are handwritten during the lecture and then converted to a PDF file and posted along with the recorded lecture on the electronic class.

Grading Policy:

Attendance	5pt
Homework	5pt
Quizzes	10pt
Mid-semester	20pt
Final exam	60pt
Total	100pt

Exam policy:

- No phones calls or web contact are allowed during the exams.
- The final exam must be completed to complete the course.
- Every student should show up 30 minutes before the final exam to help proctors verify his/her identity and walk him/her through the examination steps.

Instructor : Marwan F. Basheer

Email ID :marwanfakhry@uomosul.edu.iq

Co Instructors :

Email ID :

Thermodynamics II
MEC 251

Fall course	:	**2022-2023**
Credit Hour	:	**(2-0) 2**
Course web page	:	**https://classroom.google.com**
		Class code: gggsscn
Pre-requisites	:	Fundamentals of Engineering Thermodynamics, Heat Transfer and Internal Combustion Engines

Catalog Description:

An introduction to thermodynamics, Laws of Thermodynamics, Energies types, thermodynamic processes, Constant volume, |Constant pressure, Isothermal, Adiabatic process and Polytropic process. Control volume analysis using energy, conservation of mass for a control volume, conservation of energy for a control volume, spontaneous and non spontaneous processes , statistical thermodynamics , Entropy , thermodynamic potential , Helmholtz energy, Gibb's free energy , chemical potential ,. Exergy , exergy analysis , exergy balance , maximum work , second law efficiency , entropy generation , Exergy destruction. Exergy Analysis of Components and Cycles. Exergy analysis for combined gas turbine power plants , Optimization of thermal systems

Reference Book:

1- Fundamentals of Engineering Thermodynamics , Michael J Moran and Howard N. Shapiro , John wiley & Sonc,Inc. 2006
2- Thermodynamics An Engineering Approach, Yunus A. Gengle, Michael A. Boles. Mcgaw-Hill Higher Education 2002.
3- Engineering Thermodynamic , R.K. jput, third editions, Laxmi Publication LTD 2007.
4- Advance Engineering Thermodynamics, Adrian Bejan , John wiley & Sonc,Inc. 2006, third edition.

Course Outcomes:-

By the end of this course, students will be able to:

1. Describe and calculate thermodynamic properties of single-phase and multi- phase systems.
2. Apply the laws of statistical and classical thermodynamics to chemically reactive systems, kinetics, and combustion.
3. Relate course principles to solve problems regarding gas turbines, combustion, refrigeration, and solar energy.
4. Communicate engineering knowledge of thermodynamics through written and verbal means.
5. Applying control volume analysis for energy conservation and mass.
6. Define entropy and calculate entropy change for universe and systems.
7. distinguish between reversible and irreversible processes
8. use exergy analysis to find maximum potential work
9.estimate the second law thermals efficiency

University of Mosul

Mechanical Engineering Department

Weekly Teaching Plan:

Week 1	Introduction to thermodynamics , review of laws of thermodynamics, closed and open system,type of energy, thermodynamic process
Week 2&3	Control volume analysis using energy, conservation of mass for a control volume, conservation of energy for a control volume

<div align="center"><strong style="color:red">Homework 1   1st Quiz</div>

Week 4	spontaneous and non spontaneous processes , statistical thermodynamics , Boltzmann relation for entropy
Week 5&6	Entropy definition, relationship between entropy and Gibbs free energy
Week 7&8	statistical thermodynamics , Boltzmann relation for entropy. Entropy , thermodynamic potential , Helmholtz energy, Gibb's free energy

<div align="center"><strong style="color:red">Homework 2   2nd Quiz</div>

Week 9	Exergy , Exergy analysis , . Exergy Analysis of Components and Cycles.

<div align="center"><strong style="color:green">Mid –term Exam</div>

Week 10,11	Exergy destruction, entropy generation (applied to open and closed system)

<div align="center"><strong style="color:red">Homework 3   3rd Quiz</div>

Week 12&13	Exergy analysis for combined gas turbine power plant

<div align="center"><strong style="color:brown">Case Study</div>

Week 14	Optimization of thermal system

<div align="center"><strong style="color:red">4th Quiz</div>

<div align="center"><strong style="color:red">Final Examination</div>

Grading Policy:

Four quizzes, (each 2.5 pt)	10 pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
Four Home works (each 3 pt)	12 pt	
Mid term Exam	12 pt	
Case Study	6 pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class

Student must be in class room on time and should brought all subject notes , all tables provided by the teacher ,and they are not allowed to talk to other students during the lecture. All speech should directed to the lecturer. Students mobile must be on off mode , no permission can be given by the lecturer to the student to receive mobile calls. Students should avoid copy and paste homework ,if so all student done that would get zero degrees. Students are encouraged to use internet , google classroom , you tube , looking for similar topics which may help them to get more knowledge .

Exams policy

o All exams will be closed book
o All tables and schedules must be brought by students
o No mobile or programmable calculator are allowed
o Sharing items with other students in exam are prohibited
o The final exam must be completed in order to complete the course.
o Four Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.

Instructor   : **Dr. A. R. Habbo (Assistant Professor)**
Room No.   : **120**
E-mail ID   : abdulrahmanhabbo@gmail.com
Mobile *:*   0773-697-7185

Mechanics of Materials II

MEC 252

Spring course	:	**2023**
Credit hour	:	**(2-2-0) 4**
Course web page	:	**https://classroom.google.com**
Class code :	:	**nfywzth**
Pre-requisites	:	**Mechanics of Materials I**

Reference Books:

➢ E. J. Hearn. "Mechanics of Materials 1: (Strength of Materials), An Introduction to elastic and plastic deformation of solids and structural materials ", 3rd edition or any new edition.

➢ R. C. Hibbeler. "Strength of Materials". 12th edition or any new edition 2012.Mechanical.

Catalog Description:

The study of mechanics of materials deals with the behavior of solid bodies under load. The way in which they react to applied forces, the deflections resulting and the stresses and strains set up within the bodies are all considered in an attempt to provide sufficient knowledge to enable any component to be designed such that it will not fail within its service life. Typical components considered in detail in this volume include beams, shafts, cylinders, struts, diaphragms and springs and, in most simple loading cases, theoretical expressions are derived to cover the mechanical behavior of these components. Because of the reliance of such expressions on certain basic assumptions, the text also includes a chapter devoted to the important experimental stress and strain measurement techniques in use today with recommendations for further reading. Also Mechanics of materials (Strength of Materials) is a branch of applied mechanics that deals with the behavior of solid bodies subjected to various types of loading and gives the ability to calculate stresses, strains, shear stresses, shear strains,

deformations, etc. of objects subjected to external loads, as well as the ability to increase the knowledge of strength of materials on engineering design and their applications.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓	✓				

Course Outcomes:

1. An ability to remembering knowledge of science and engineering in Mechanics of Materials I (strength of materials I).
2. An ability to Identifying the design and conduct experiments, as well as to analyze and interpret data.
3. An ability to understanding the design of a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to classifying function on multi-disciplinary teams.
5. An ability to applying formulates, and solves engineering mechanics problems.
6. An ability to using the charts and tables and drawing the diagrams.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1-2-3	**Slope and deflection of beams:** Introduction; Direct integration method; Macaulay's method; Macaulay's method for Uniform distributed load Macaulay's method for beams with u.d.1. applied over part of the beam; Macaulay's method for couple applied at a point; Relationship between loading, S.F., B.M., slope and deflection; Problems		
Week 4	Tutorial sheet No.1	Homework 1	Quiz 1
Week 5-6-7	**Thin Cylinders and Shells.** Introduction; Thin cylinders under internal pressure; Hoop or circumferential stress; Longitudinal stress; Changes in dimensions; Thin rotating ring or cylinder; Thin spherical shell under internal pressure; Change in internal volume; Vessels subjected to fluid pressure; Cylindrical vessel with hemispherical end; Effects of end plates and joints; Problems.		
Week 8	Tutorial sheet No.2	Homework 1	Quiz 2

Week 9-10-11	**Complex Stresses:** Introduction; Stresses on oblique planes ; Material subjected to pure shear; Material subjected to two mutually perpendicular direct stresses; Material subjected to combined direct and shear stresses; Principal plane inclination in terms of the associated principal stress.
Week 12	Tutorial sheet No.3 Homework 3 Quiz
Week 13-14	**Complex Strain and the Elastic Strain:** Introduction; Application of Mohr's circle to combined loadings, Mohr's circle for strains, columns, Euler's formula for long columns.
Week 15	Tutorial sheet No.4 Homework 4 Quiz 4

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Attendance	5pt	**Note:** Attendance is compulsory, and
Participation	5pt	absence from more than five lectures leads
1st term Exam	10pt	to a zero attendance mark.
2nd term Exam	10pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in class:

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

1. Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).

2. Do not speak to your friends during the lectures. If you have a question about the material, please raise your hand to ask the instructor.

3. Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do not use electronic devices to access games, Facebook, twitter or other non-related course material.

4. If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.

5. Don't ask the instructor about the following:

1. Exam question patterns
2. Increase your grade or letter
3. Postpone exam or extend the due dates (deadlines) for submission projects and homework.

Failure to meet behavioral expectations ma y results in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark=Work Mark / No. of coping students)

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

1. All exams will be Closed Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
2. No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
3. The final exam must be completed in order to complete the course.
4. Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
5. Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.)

Instructor: Majid Midhat Saeed

Room No.: 119

Email: majidsaeed@uomosul.edu.iq

Fluid Mechanics II

MEC 253

Spring course	:	**2022-2023**
Credit Hour	:	**(2-0-0) 2**
Course web page	:	**https://classroom.google.com**
Class code :	:	**r7htwmt**
Pre-requisites	:	**Fluid Mechanics I**

Reference Book:

➢ Fluid Mechanics Fundamentals And Applications, Çengel, Yunus A., 2006, Mcgraw-Hill Higher Education.

➢ Fluid Mechanics, Frank M. White., seventh edition, 2009, Mcgraw-Hill series in mechanical engineering.

Catalog Description:

This course provides and deals with different types of liquids at different temperatures and conditions, in addition to study the different equations that govern these fluids in static and moving conditions. The course has different subjects and topics which make the student have the enough understanding in thermal power field. The way in which they react to applied forces, accelerations, and the shear and normal stresses and strains set up within the fluids are all considered in an attempt to provide sufficient knowledge to the students to be able to work and design different equipment in fluids field. The study of fluid mechanics is the study of the behaviour of fluids (liquids and gasses) under static and dynamic conditions.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓	✓				

Course Outcomes:

Upon successful completion of this course, students will be able to

1) Apply impuls-momentum principles and applications.
2) Demonstrate an understanding of ideal fluid flow.
3) Describe similitude and dimensional analysis.
4) Understand of basic viscous flows.
5) Understand of momentum-integral methods.
6) Calculate friction losses in pipes.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1	Review Of The Kinematics Of The Flow Field
Week 2-3	Impulse – Momentum Principles And Applications
	Quiz
Week 4-6	Propellers And Impulse Turbines
Week 7-8	Pipe Fittings
	1st term Examination
Week 9	Similitude And Dimensional Analysis
Week 10-11	Flow Of Real Fluids – Basic Concepts Of External, Internal, Laminar And Turblent
	Quiz
Week 12 -13	Definition Of Boundary Layer
Week 14-15	Friction losses in pipes
	2nd term Examination
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	5pt	
Participation	5pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
1st term Exam	10pt	
2nd term Exam	15pt	
Final Exam	60pt	
Total	100pt	

Students' behavior in Class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

➢ Students must be in the classroom on time and bring all subject notes and lectures provided by the teacher.

➢ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➢ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➢ Students should avoid copying and pasting homework.

➢ Students are encouraged to use internet resources to enrich their knowledge about vibration topics.

Copy and Paste Policy

The student's work is canceled if the instructor notices any actions of copying and pasting.

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Mechanical Engineering Department

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

- ➢ All exams will be closed book
- ➢ No mobile or programmable calculator is allowed
- ➢ Sharing items with other students in the exam is prohibited
- ➢ The final exam must be completed to complete the course.

Instructor: Dr. Ahmed Khalid

Room No.: E 108

Email: alnajar.ahmed9@uomosul.edu.iq

Computer Aided Mechanical Drawing

MEC 254

Spring course	:	**2023**
Credit hour	:	**(1-3-0) 2**
Course web page	:	https://classroom.google.com
Class code :	:	5rbdlal
Pre-requisites	:	Mechanical drawing

Reference Books:

Engineering Drawing and Design, David A. Madsen, 1989.
Mechanical Drawing Board & CAD Techniques, Student Edition, McGraw-Hill Education, 1997.
Machine drawing, R.K.DHAWAN. 2008

Catalog Description:

Study of detail drawings with demonstrate the creation of 3D geometry using software (AutoCAD). Demonstrate the techniques of specifying threads and fasteners. Describe the theory and techniques for creating detail and assembly drawings of complex machines. Present a model for the design process (problem identification, ideation, analysis and refinement, decision and implementation) from conception through working drawings.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
	✓	✓				✓

Course Outcomes:

At the completion of this course, the student will have demonstrated the ability to:

1- Create 3D models of machine parts utilizing AutoCAD software

2- Utilize Inventor to prepare and print mechanical detail and assembly drawings derived from 3D part files.

3- Fully dimension detail drawings in a manner that is in compliance with the ASME Y14.5-2009 dimensioning standard.

4- Prepare section views of machine parts that comply with the ASME Y14.3-2003 standard.

5- Prepare auxiliary views of machine parts with Inventor that complies with the ASME Y14.3-2003 standard.

6- Utilize Inventor to prepare multi-sheet working drawings for a mechanical assembly that complies with the ASME Y14.34-2008 standard.

7- Apply Geometric Dimensioning and tolerance techniques to machine parts in a manner that complies with the ASME Y14.5-2009 standard.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week	
Week 1-2	**Drawing using Auto CAD 2D**
	Drawing using Auto CAD 2D and the students will draw a class work.
Week 3-4	**Gears**
	Draw a Spur Gearing, Draw a bevel Gearing + Quiz1
Week 5-7	**Drawing using Auto CAD 3D**
	Couplings, bearings…
Week 8	**Drawing using Auto CAD 3D**
	Screw Jak, Hydraulic Pipe
Week 9	**Drawing using Auto CAD 3D**
	Hydraulic Pipe
Week 10-11	Forced damped vibration of two degrees of freedom systems.
	Quiz2
Week 12 -13	**Drawing using Auto CAD 3D**
	Pipe Vice, Oil Burner
Week 14	**Mid semester Exam**
Week 15	Final Exam

Grading Policy:

Classwork	15pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
Quizzes	10pt	
1st term Exam	10pt	
2nd term Exam	15pt	
Final Exam	50pt	
Total	100pt	

Students' behavior in class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).

- Do not speak to your friends during the lectures. If you have a question about the material, please raise your hand to ask the instructor.

- Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do not use electronic devices to access games, Facebook, twitter or other non-related course material.

- If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.

- Don't ask the instructor about the following:

    1. Exam question patterns

    2. Increase your grade or letter

    3. Postpone exam or extend the due dates (deadlines) for submission projects and homework.

Failure to meet behavioral expectations ma y results in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark = Work Mark / No. of coping students).

University of Mosul

Mechanical Engineering Department

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

o   All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
o   No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
o   The final exam must be completed in order to complete the course.
o   Two Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
o   Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.

Instructor   : Dr. Mohammed Najeeb Abdullah
Room No.   : 309
Email ID   : moh_77@uomosul.edu.iq

Co-Instructor   : Emad Hazem
Room No.   : E 104
Email ID   : emades2004@yahoo.com

Mechanical Engineering Laboratory I

MEC 256

Spring course	:	**2022-2023**
Credit Hour	:	**(0-3-0) 1**
Course web page	:	**https://classroom.google.com**
Class code :	:	
Pre-requisites	:	

Reference Book:

➢ Fluid Mechanics Fundamentals And Applications, Çengel, Yunus A., 2006, Mcgraw-Hill Higher Education.

➢ Fluid Mechanics, Frank M. White., seventh edition, 2009, Mcgraw-Hill series in mechanical engineering.

Catalog Description:

Students are highly encouraged to maintain a separate lab notebook for recording any observations, results, or comments while performing the experiments. You will also find it helpful to carry a USB drive to download data, or a camera to record images. To ensure that there are no injuries or accidents, lab safety training is mandatory. Lab attire includes close-toed shoes; no shorts or loose clothing/hair. Follow common sense in the lab-running around, jumping, etc. can be potentially dangerous. Each lab module requires a lab report, in which the students complete the lab write-up questions within the module reader, due at the beginning of the laboratory session for the subsequent lab module. Late submission of reports/assignments will lead to a 10% decrease in points per day.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓	✓				

Course Outcomes:

Upon successful completion of this course, students will be able to

1) Learn how to gain knowledge by looking at reality, not an attempt to make reality conform to preconceptions. The important thing is to learn how to be observant, to really see what happens, and to deal with this information with the strictest integrity. And to understand, or learn to understand, the meaning of what happens.

2) Provide an experimental foundation for the theoretical concepts introduced in the lectures. It is important that students have an opportunity to verify some of the ideas for themselves.

3) To familiarize students with experimental apparatus, the scientific method, so that they will have some idea of the inductive process by which the ideas were originated. To teach how to make careful experimental observations and how to think about and draw conclusions from such data.

4) To learn how to write a technical report this communicates scientific information in a clear and concise manner.

5) Understand of momentum-integral methods.

6) Calculate friction losses in pipes.

Weekly Teaching Plan: February 26, 2023, to July 2, 2023

Week 1-2	Tensile Test
Week 3-4	Rockwell Hardness
Week 5-6	Universal Beam
Week 7-8	Moment of Inertia of Flywheel
	1st term Examination
Week 9-10	Adiabatic Index
Week 11-12	Rope-belt Friction

Week 13 -14	Engine Model
Week 15	2nd term Examination
Final Exam	

Grading Policy:

Reports	20pt	
Participation	10pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
1st term Exam	10pt	
2nd term Exam	10pt	
Final Exam	50pt	
Total	100pt	

Students' behavior in Class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

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➢ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➢ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➢ Students should avoid copying and pasting homework.

➢ Students are encouraged to use internet resources to enrich their knowledge about vibration topics.

Copy and Paste Policy

The student's work is canceled if the instructor notices any actions of copying and pasting.

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Exams policy

➢ All exams will be closed book

➢ No mobile or programmable calculator is allowed

➢ Sharing items with other students in the exam is prohibited

➢ The final exam must be completed to complete the course.

Instructor: Dr. Ali Ghazi Mohammed Kamil

Room No.: 214

Email: aligm@uomosul.edu.iq

Co-Instructor: Dr. Ammar Younes

Room No.: 215

Email: drammar2020@uomosul.edu.iq

Co-Instructor: Bakr Nouri

Room No.: 408

Email: bakralhsan@uomosul.edu.iq

Co-Instructor: Marwan Fakhry

Room No.: E117

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Co-Instructor: Noureddine Saleh

Room No.: E107

Email: nooraldin2017@uomosul.edu.iq

Co-Instructor: Ghaida Ibrahim

Mosul University

Mechanical Engineering Department

Room No.: E106

Email: ghaidaa.alsarraj2019@uomosul.edu.iq

Co-Instructor: Tariq Muhammad

Room No.: E107

Email: tariq@uomosul.edu.iq

Co-Instructor: Zeina Mysser

Room No.: E105

Email: zenaamsc13@uomosul.edu.iq

Computer Aided Engineering Application (ENC260)

Fall course	:	**2022**
Credit hour	:	**(2-0-0) 2**
Course web page	:	**https://classroom.google.com**
Class code	:	**2eq7iv6**
Pre-requisites	:	**Mathematics II**

Reference Books:

➢ Mastering EES, by S.A. Klein and G.F. Nellis
➢ Engineering Thermodynamics with EES: concepts and applications, by José A. Orosa , Armando C. Oliveira

Catalog Description:

This course provides student with hand on experiences with the use of modern computer software to solve applied engineering problems.

Quizzes/Exams

▪ There will be 4 quizzes, two (one hour long) exams, mid-term exam, and a final exam.
▪ All will be closed-book, closed-notes, unless specifically stated otherwise.
▪ No make-ups will be given unless prior approval has been granted.

Homework

▪ There will be approximately 7-9 homework sets assigned which will be posted on the course Google Classroom site. Solutions will be posted after the due date.
▪ Grading criteria for homework problems listed here as:

A Good attempt with no errors or minor errors

B Good attempt with conceptual deficiency

C Weak attempt and/or major conceptual deficiency

D No attempt found

<u>**Course Objectives**</u>

The objective of this course is to enable students to build a code with the help of available subprogram library and material properties database to solve applied engineering problems such as:

1. Thermodynamics cycles (Cranot cycles, Rankine cycles, refrigeration cycles, otto cycles, diesel cycles, etc)
2. Solid mechanics, strength of material, deflection, moment of inertia.
3. Solve linear system of equations
4. Solve nonlinear system of equations
5. Table integration
6. Solve parametric problems.

Students' behavior in class

Please adhere to the following expectations to ensure a respectful environment that allows all students to learn effectively in all classes.

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➢ Students are not allowed to talk to other students during the lecture. All speech should be directed to the lecturer.

➢ Students' mobile must be off-mode, and the lecturer cannot permit the student to receive mobile calls.

➢ Students should avoid copying and pasting homework.

➢ Students are encouraged to use internet resources to enrich their knowledge about related topics.

Instructor   : Dr. MUYASSAR EDRIS ISMAEEL
Room No.   : 108
Email ID   : muyassar.alhasso@uomosul.edu.iq

Instructor   : Dr. Ahmed khalid Ibrahim
Room No.   : E108
Email ID   : alnajar.ahmed9@uomosul.edu.iq

University of Mosul

Mechanical Engineering Department

Co-Instructor : Mrs. Eman M. Ali
Room No.   :
Email ID   : **emanmali@uomosul.edu.iq**

Last updated : March 2022

NON-DESTRACTIVE TESTING

MEC261

Spring course	:	**2023**
Credit hour	:	**(1-0-1) 1**
Course web page	:	**https://classroom.google.com**
Class code :	:	xgsuzyw
Pre-requisites	:	**Physical Metallurgy**

Reference Books:

1-J. Boogaard and G.M. van Dijk (Eds.) ,**" Non-Destructive Testing ",** North Holland 1989

2-Giuseppe Lacidogna, Nondestructive Testing (NDT), *Applied Sciences*,2021.

3-Paul E. Mix, Introduction to Nondestructive Testing: A Training Guide, Second Edition, Copyright © 2005 John Wiley & Sons, Inc.

4-Charles J. Hellier, Handbook of Nondestructive Evaluation, Second Edition, 2013,McGraw-Hill Education

5-Baldev Raj, T. Jayakumar, M. Thavasimuthu,Practical Non-destructive Testing, Woodhead Publishing, 2002.

Catalog Description:

Non-destructive testing is a scientific course focusing in effective method to find crack inside machine part or welding lines. The flaw detection depends on the NDT types that each type has specification such as the visual test especially for surface crack while the ultrasonic test was used for deep hole.

The approach of the course is based on explaining the details of the Non-destructive testing, and the NDT was used in sequential and interrelated stages, enabling the student to select the effective NDT type clearly, according to the degree of importance of the process, its level of complexity, and the user's need for it according to the level of his capabilities and his ability of dealing with the details, orders and elements of the software.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v
✓	✓	✓	✓	✓

Course Outcomes:

Upon successful completion of this course, students will be able to

1) Describing the principles of NDT (i).
2) Describing the important tools used in NDT (ii).
3) Explaining the NDT types depending on crack position. (iii).
4) Training to use the NDT device basic on crack or void (iv).
5) Training to do inspection for machine part or welding line. (v).

Weekly Teaching Plan: March 26, 2023, to July 2, 2023

Week 1	**Introduction to NDT.**
	• Show difference between DT and NDT.
	• NDT types.
Week 2	**Visual inspection**
	• How to test.
	• unaided test
	• aided test
	• Lighting system used with inspection.
Week 3,4	**Dye penetration test**
	• Dye penetration tools.
	• How to test.
Week 5,6	**Magnetic particles test**
	• Magnetic test tools
	• How to test.
Week 7	**UV light with particles**

	• UV light tools
	• How to test.
Week 8,9	**Ultrasonic test**
	• Ultrasonic test tools.
	• waves types used in UT
	• Probe types
	• How to discover crack by screen
	• How to test.
Week 10,11	**Eddy current test**
	• ECT tools
	• Probes used in ECT.
	• How to discover crack by screen.
	• How to test.
Week 12	**Radiography test**
	•RT tools
	• How to test.
Week 13	**How to select NDT to show cracks**
	• NDT selection
	• Discover of cracks
	• Make decision and analysis.
	• How to write NDT report.
Week 14	**Final Couse Exam**
	1st Term Examination

Grading Policy:

Students Attendance	2pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
Select higher quizzes	8pt	
1st term Exam	15pt	
2nd term Exam	15pt	

Overall	40pt
Final Exam	60pt
Total	100pt

Students' behavior in class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).

- Do not speak to your friends during the lectures. If you have a question about the material, please raise your hand to ask the instructor.

- Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do not use electronic devices to access games, Facebook, twitter or other non-related course material.

- If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.

- Don't ask the instructor about the following:

    1. Exam question patterns

    2. Increase your grade or letter

    3. Postpone exam or extend the due dates (deadlines) for submission projects and homework.

Failure to meet behavioral expectations ma y results in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark=Work Mark / No. of coping students).

Classroom:

Time: TBD.

Course web page: https://classroom.google.com

Google Classroom: If you have questions, please do not hesitate to contact the instructor.

Please, check Google classroom regularly for any updates.

The information contained in this syllabus is subject to change without notice.

Students are expected to be aware of any additional course policies presented by the instructor during the course.

Email Policy:

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

Computer Usage:

Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site.

Teaching Techniques:

Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students.

Exam Policy:

- o All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
- o No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
- o The final exam must be completed in order to complete the course.
- o Quizzes 40-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
- o Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.

Instructor   : Dr. Anas Obeed Balod
Room No.   : 308
Email ID   : anasbalod@uomosul.edu.iq
Last updated   : March 2021