INTRODUCTION TO VIBRATION

MEC401

Spring course	:	**2023**
Credit Hour	:	**(2-0-1) 2**
Course web page	:	**https://classroom.google.com**
Class code :	:	
Pre-requisites	:	**Static, dynamic, and theory of machine**

Catalog Description:

This course reviews the fundamentals of dynamics and general information about vibratory systems (components and physical effects). The dynamic behavior of vibratory systems (Deterministic and random motions) is included in this course. The degrees of freedom and generalized coordinates are taught. Different types of vibratory systems are classified and illustrated as:

➤ Single degree of freedom systems.
➤ Un-damped free vibration
➤ Damped free vibration.
➤ Forced vibration.

The mathematical models of the physical systems are explained, and the dynamic behavior of the vibratory systems based on initial conditions is analyzed analytically. Newton's law, energy, and equivalent methods are used for fully solved examples, emphasizing real-world applications. Also, the stability of systems and vibration measuring instruments are described.

Reference Book:

➤ Engineering Vibrations, William J. Bottega, 2013, Taylor & Francis Group, LLC, USA**.**
➤ Mechanical Vibrations, Singiresu, S. Rao, fourth (Revised), 2005, Prentice-Hall, NJ, USA.
➤ Mechanical vibrations, ANIL V. RAO, 2009, University of Florida, USA.

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) Understand the vibration and its effects (advantages and disadvantages) on the human body and machines. (i)
2) Recognize the vibratory systems (components and physical effects) (ii).
3) Determine the degrees of freedom and generalized coordinates (iv).
4) Derive the equation of motion using different methods (free body diagram, energy, and equivalent methods) (v).
5) Calculating Natural frequency of the system (iv).
6) Evalute Dynamic behavior based on initial conditions (v).

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

Week 1-3	Briefly review the principles of dynamics. Basic definitions and concepts of mechanical vibration. Dynamic behavior of vibratory systems (periodic, non-periodic, and random motions). Classification of oscillation. Reduction of mechanical system vibration. Spring-mass system and pendulum.
Week 4-6	Degrees of freedom and generalized coordinates. Components of vibratory systems. The equivalent of spring, mass, and damper system. Examples of real-world applications.
	Tutorial sheet No.1 Homework 1

Mechanical Engineering Department

Week 7-9	Free un-damped vibration of a single degree of freedom system. Derive the equation of motion, calculate the natural frequency, and determine the dynamic behavior of the system based on initial conditions.
	Tutorial sheet No.2 Homework 2 1st Quiz
Week 10-12	Free damped vibration of single degree of freedom system. (Viscous, coulomb, and hysteretic damping).
	Tutorial sheet No.3 Homework 3 2nd Quiz
Week 13-14	Forced un-damped vibration of single degree of freedom systems.
	1st term Examination
Week 15-16	Forced damped vibration of single degree of freedom systems. Examples (fully solved problems).
	Tutorial sheet No.4 Homework 4 3rd Quiz
Week 17	Course review
	2nd term Examination
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	10pt	**Note:** Attendance is compulsory, and absenteeism of more than five lectures will cause no attendance mark.
Attendance	5pt	
1st term Exam	10pt	
2nd term Exam	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; if so, all students who have done that would get zero scores.

➤ 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:. Omar A. Mohammed

Room No.: 104

Email: omar.a.mohammed@uomosul.edu.iq

Internal Combustion Engines

MEC402

Spring course	:	**2023**
Credit hour	:	**(2-0-1) 3**
Course web page	:	**https://classroom.google.com**
Class code :	:	**mvd55yy**
Pre-requisites	:	**Introduction to combustion**

Reference Books:

➢ Internal Combustion Engines: Applied Thermo sciences, Allan T. Kirkpatrick, John Wiley & Sons Ltd. 4th edition, 2021

➢ Engineering Fundamental of the Internal Combustion Engines, Willard Pulkrabek, Prentice Hall. 2016

➢ Internal Combustion Engines Fundamentals, John .B. Heywood, John wiley & Sons, Inc. 1989

➢ Fuels and combustion, Sharma, S.P., and Chander Mohan, Tata McGraw- Hill Publishing Co., Ltd , New Delhi 1987.

Catalog Description:

This course provides an introduction to internal combustion engines , type of I.C engines, combustion definition and types. Different types of engine types are described and calculated as : .Air standard cycles , definitions and Calculation (Otto , Diesel and Dual cycles).

➢ Fuel-air cycles, Assumption and calculation.

➢ Actual engines cycles.

➢ Criteria performance of I.C. engines (Spark ignition , Diesel and Dual engines)

➢ Which involve determination of thermal efficiency , specific fuel consumption , mean effective pressure and power output.

Moreover , Combustion phenomena in both spark ignition engine and compression ignition engines, Knock and surface ignition would be demonstrates.

Gas turbine unit , simple and modified cycles, and performance calculation are carried out. In addition to that, turbojet engine, turbofan , turbo propeller air craft engines and their performance are calculated. Finally exhaust emission from internal combustion engines, methods are used to reduce emission and after treatment method such as thermal and catalytic convertor.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓			✓	✓		

Course Outcomes:

Students who study internal combustion engines will be able to

1) Classify internal combustion engines.
2) Calculate air standard cycles performance.
3) Describe the main differences between Otto, Diesel and Dual cycles.
4) Analysis the fuel-air cycle and make a comparison with actual cycles.
5) Describe the combustion phenomena in S.I. engines and C.I. engines.
6) Define Abnormal combustion, Knock, and surface ignition.
7) Classify the gas turbine units and their cycles, simple and modified cycles.
8) Classify the air craft engines and performance calculation, turbojet engine , turbo-fan and turbo propeller
9) Analysis the exhaust emission from internal combustion engine.
10) Introduce suitable method for reducing exhaust emission such as CO, HC, SO_x, NO_x and others.

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

Week 1	Classify the internal combustion engines
Week 2&3	Revision of air-standard cycles, Introducing fuel-air cycles, Constant volume and Constant pressure fuel-air cycles, definition and calculations. Deviation of actual engine cycles from air and fuel-air cycles.
Week 4	**(Tutorial sheet No.1 H.W_1 First Quiz**
Week 5	Combustion phenomena in spark ignition engines, (normal and abnormal combustion), Knock in spark in spark ignition engines, factors effect Knock , effect of Knock
Week 6 &7	Combustion phenomena in compression ignition engines, (heat released diagram), stages of combustion in compression engine, ignition delay .
Week 8	**(Tutorial sheet No.2 H.W_2 Second Quiz**
Week 9	Performance of gas turbine including power output and so on.
Week 10	Tutorial sheet No.3 Homework 3 third Quiz
Week 10&11	Gas turbine used as an air craft engines, turbo propeller , turbo fan , turbo jet engines as well as ramjet engine.
Week 12	**(Tutorial sheet No.4 H.W_4 Fourth Quiz**
Week 13	**2 st term Examination**
Week 14	Air pollution , pollutants emitted from spark and diesel engines such as CO, HC, NO_x
Week 15	**(Tutorial sheet No5 H.W_5 Fourth Quiz**
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 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. A. R. Habbo "Assistant Professor"

Room No.: 120

Email: abidhabbo20@uomosul.edu.iq

Assessment tools for ME402								
		ملاحظات	i	ii	iv	v	SUM	نسبة النجاح
Home works	5pt							
HW1	1pt		1	1			1	6 %
HW2	1pt			1			1	7 %
HW3	1pt				1		1	6 %
HW4	1pt				1		1	8 %
HW5	1pt					1	1	60 %
							5 pt	4% pt
Quizzes	5pt						1	
Q1	1pt		1				1	6 %
Q2	1pt		1				1	5 %
Q3	1pt			1	1		1	4 %
Q4	1pt				1		1	4 %
Q5	1pt				1			2 %
							4 pt	3 pt
1st term Exam	10pt		2	2	3	3	10 pt	7 pt
2nd term Exam	15pt		4	2	4	5	15 pt	8 pt
Final Exam	60pt		10	15	20	15	60 pt	49 pt
Participation+ Attendance	5 pt						5 pt	4 pt
Total	100pt		14	20	31	24	100pt	71pt

Mosul University

Mechanical Engineering Department

Control and Measurements
ME405

Academic Semester	:	**Autumn (2023)**
Credit Hour	:	**(2-0-1) 4**
Course web page	:	**https://classroom.google.com**
Pre-requisites	:	Numerical Analysis

Catalog Description:

The subject of control and measurements is instructed to the final year, (4th year), in the department of mechanical engineering. The major part of the subject is the so called classical control, which comprises basics but essential to this wide multidisplinary field. Classical control starts by establishing transfer function for components or sub-systems. In other words, modeling of different components or sub-systems is performed using the first principles. Most of the engineering relationships are non-linear, then linearization is needed so that the linear control theory can be applied. Modeling of mechanical, thermal, fluidic and electrical components are represented by blocks so that subsystem or complete control system's block diagrams are established. Field controlled DC motors and armature-controlled DC motor driving mechanical subsystem are represented by block diagrams. Other actuators such as hydraulic is presented too. Prior to introducing the feed-back control, the block diagram algebra is to be studied for block diagram reduction. For different application, a complete control system is constructed with their block diagram. Steady-state operation is found useful to realize the feedback principles and to estimate some of system parameters.

Reference Book:

- Text Book: Automatic Control Engineering by Francis H. Raven, University of Notre Dame.
- Modern Control Engineering by K. Ogata, University of Minnesota.
- Automatic Control System, by Benjamin Kou, ninth edition, 2010.

Course Outcomes:

1. Modeling of subsystem and systems for the purpose of control.
2. Determining transfer function for different system components, first order subsystem and time constants applied to mechanical, thermal, fluidic, electrical, …. Etc.
3. Building block diagrams to represent open loop and closed loop control systems.
4. Linearization of non-linear relationships.
5. Modeling of DC motors and hydraulic amplifier as actuator in systems.
6. Block diagram algebra for simplifying complicated block diagram of systems.
7. Modeling and building a complete block diagram.
8. Analyzing steady-state operation of feedback control system.

Weekly Teaching Plan:

Teaching Week	Class Topic
Week 1	General introduction on the subject of control & measurements in different branches of engineering., mech. Elect. Chem. Civil prod. ..etc
Week 1,2	Basic requirements for the subject and the connection between control and measurements (measurements here means sensors) giving some example& the contents of the subject.
First Quiz	
Week 3,4	Definitions of terms and the meaning of transfer function, and why Laplaces transforms. Open loop and closed loop systems
Week 5,6	Representation of control systems components, mechanical rotational, fluidic, thermal and electrical. First-order system and time constants for different sub-systems.
Second Quiz	
Week 7,8	Dynamic equations and block-diagram representation of some actuators normally used in control systems, hydraulic integrator and hydraulic actuator, field-controlled D.C motors and armature-controlled D.C motors.
Third Quiz	
Week 9,10	Linearization of non-linear relationships and why it is needed in control system representation. Hydraulic actuator with load as an example on linearization and other examples.
Week 11,12	Block diagram algebra and simplification rules, solving an example on simplification. Examples on complete control and building block diagrams with reference input and disturbances.
Forth Quiz	
Week 12,14	Steady state operation and the evaluation of steady state block diagram constants. Steady s. equation of operation, controller and system to be controlled characteristic curves.
Week 15,16	Lecture on measurements &sensors, temperature, pressure & rotational speed.

1st Term Examination

Mosul University

Mechanical Engineering Department

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). [SEP]

- 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. [SEP]

- 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 notices 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 may be 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:

Four quizzes, (each 5pt)	12pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
Report and (or) Homework (in total)	8pt	
1st term Exam	10pt	
2nd term Exam	10pt	
Final Exam	60pt	
Total	100pt	

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 Four Quizzes 40-minute duration time, will be arranged with the students representative.

o Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.

Instructor : Khalid Elias Hammo
Room No. : 304
Mobile: 07701729822
E-mail: khalid1974@uomosul.edu.iq

Co - Instructor: Arab Ghazi Azeez
Room No. : 312
Mobile: 07736977242
E-mail: arabghaziazeez@uomosul.edu.iq

Power Plant

MEC421

Autumn course	:	**2022**
Credit hour	:	**(0-0-3) 3**
Course web page	:	**https://forms.gle/NQgvipxGtTKE6KUS9**
Class code :	:	uqtwt7k
Pre-requisites	:	**Convection and Radiation Heat Transfer**

Reference Books:

➢ Power Plant Engineering, P.K. Nag, McGraw hill. 2008
➢ Thermodynamics an Engineering Approach, Yunus A. Gengel, Michael A. Boles, Fifth Edition, 2006
➢ Boiler Operation Engineering: Question and Answers. Chattopdhyay, P. 2nd, Edition, 2001
➢ Power Plant System Design, Li W., Priddy P., John Wiley & Sons, Canada 1985

Catalog Description:

Provides the student with an introduction to power plant, the major types systems and components that make up a power plant. what the thermodynamic cycles used in power plant and specific attention is given to regeneration (close and open feedwater heater), cogeneration, binary and combined cycle, how boilers, and condensers operate. This course covers, boiler and heat recovery steam turbine types with their components (economizer, super heater, preheater), also types of cooling towers and condensers. This course also covers the types and major component of hydroelectric and nuclear power plan

Course Outcomes:

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

1. Classify power plant
2. Analyze the ways to improve Rankine cycle.
3. Classified the combined gas turbine cycle, binary cycle
4. Analyze the performance of boilers and describe their components
5. classified condenser cooling tower
6. Classified hydroelectric power plant.

University of Mosul

Mechanical Engineering Department

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

Week 1-2	Introduction to power plant Introduction Definition, Power Plant Classification, Energy and environment, World's population and world energy consumption, World economic
Week 3-4	Vapor Power Plant Cycles : Rankine Cycle (R.C.) Review, Deviation of Actual Vapor Power Cycle from Ideal Cycle (Real R. C.), Methods Can be Used to Increase Rankine Cycle Efficiency, Reheat.
Week 5-6	Regenerative Rankine Cycle
	Tutorial sheet No.1 Homework 1 Quiz
Week 7	Binary R.C Introduction to binary cycle. Examples
Week 8-9	Combined gas turbine Cycle
	1st term Examination
Week 10-11	Boiler Definition and classification, description of boiler components, Economizer evaporator and super heater, almond and benson boiler
	Tutorial sheet No.2 Homework 2 Quiz
Week 12 -13	Condenser: Introduction to condenser, Types of condensers and description of condenser components
Week 14-15	Hydroelectric power plant: Introduction, The main elements of hydroelectric power plant, Hydraulic turbine, Turbine selection
	Homework 3 Quiz
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	10pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Attendance	5pt	
Participation	5pt	
1st 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://forms.gle/NQgvipxGtTKE6KUS9

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. Mohammed Saleh & Dr. Ali Ghazi

Room No.: 114

Email: moh62sam@uomosul.edu.iq

Nonmetallic-Engineering Materials

MEC 425

fall course	:	**2023**
Credit hour	:	**(2-0-0)**
Course web page	:	https://classroom.google.com/c/NTU1NjkyMjYwMzc4?cjc=ialtpptPq3qiri
Class code :	:	Class code:zgc5ule
Pre-requisites	:	Metallic-Engineering Materials MEC361

Reference Books:

1-"Fundamentals of material science and engineering", William.d.callister, 4th ed., John weily &sons, 2012, U.S.A

2- "The Science and Engineering of Materials", D. R. Askeland PWS Print version 2011

3-Modern physical metallurgy and material engineering, R.E.S and R.J.Bishop, Boston, Butterworth Heinman, Sixth edition, 1999.

4-Material science, R.S.Khurmi, R.S.Sedha, Ram Najar, New Delhi, 1987.

5-Materials and metallurgy", G.B.S. Narang and V.K.Manchanda, Bajrangi press, New Delhi.

Catalog Description:

 This course provides a thorough explanation of non-metallic materials, including polymers, composites, ceramics, and information on each material's types, production methods, mechanical characteristics, and engineering uses. Choosing non-metallic materials for various case studies is the last step.

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 about polymer which include chemical reactions and type of polymers, properties of polymer with their industrial applications and manufacturing process.

2-Learn about plastic recycling process.

3-Learn about types of ceramic materials their equilibrium diagrams, properties and applications.

4-Learn about cement and cement production methods.

5-Learn on the types, classifications and applications of composite materials.

6-Learn on composite materials design and analysis.

7-Learn the selection of Nonmetallic material for different case study.

Weekly Teaching Plan: November 1, 2022, to March 1, 2023

Week 1-2	Introduction to Polymers, Polymerization, Polymer types, Bonding and physical properties and plastic additives
Week 3-4	Recycling of plastic, recycling code and recycling process
	Homework 1 Quiz
Week 5-7	Plastic processing, Injection Molding, Extrusion Molding, Blow molding
	Homework 2 Quiz

Week 8	Plastic processing, vacuum molding, foaming, Rotational Molding, Calendaring , Molding defects.
	Homework 3 Quiz
Week 9	Ceramic materials, Ceramic structures, Ceramic processing, Mechanical properties ,Variability in mechanical properties.
	1st term Examination
Week 10	Powder Metallurgy, Sintering, Characteristics of the metal powders, Manufacturing of Metal Powders, Blending and Mixing of Powders , Heat treatment of powders, Compacting
	Homework 4 Quiz
Week 11 -13	Introduction to Composite Composite, Composite Classifications, Polymer Matrix Composites, Manufacturing of PMC
	Homework 5 Quiz
Week 14	Type of Composite Systems Metal Matrix Composites Manufacturing of MMC, Ceramic matrix composites,
	2nd term Examination
Week 15 Manufacturing of CMC, Carbon–Carbon Composites, Analysis of mechanical property of composite	
Week 16 Selection of Nonmetallic material for different case study.	
Final Exam	

Grading Policy:

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

➢ 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/c/NTU1NjkyMjYwMzc4?cjc=ialtpptPq3qiri

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: Ahmed N. Rashid
Room No. :304, Mechanical Engineering Department (main building), 3rd floor
Email ID :ahmed.n.rashid@uomosul.edu.iq
Co instructor: Mohammed Shaalan Abed
Room No. :310, Mechanical Engineering Department (main building), 3rd floor
Email ID :mohammedfathi@uomosul.edu.iq

Assessment tools for MEC 425								
		ملاحظات	i	ii	iv	v	SUM	نسبة
Home works	5pt							
HW1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الواجب ؟		1			1	70 %
HW2	1pt			1			1	80 %
HW3	1pt				1		1	80 %
HW4	1pt				1		1	80 %
HW5	1pt					1	1	70 %
							5 pt	3.8 pt
Quizzes	5pt						1	
Q1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الامتحان القصير ؟	1				1	50 %
Q2	1pt		1				1	60 %
Q3	1pt			1	1		1	40 %
Q4	1pt				1		1	40 %
Q5	1pt				1			30 %
							5 pt	2.2 pt
1st term Exam	15pt	ما المحصل التعليمي المستهدف تحقيقه؟	2	2	3	3	10 pt	5 pt
2nd term Exam	15pt		4	2	4	5	15 pt	9 pt
Final Exam	60pt		10	15	20	15	60 pt	45 pt
Total	100pt		14	20	31	24	100pt	64 pt

Renewable Energies
MEC422

Fall course	:	**2022**
Credit Hour	:	**(2 – 0 – 0) 2**
Course web page	:	**https://classroom.google.com/c/NTQ3MDE5ODAyNDQ0**
Classroom code	:	bap2u4p
Pre-requisites	:	**Solar Energy MEC364 or Turbomachinery MEC360**

Reference Books:

- Kanoğlu M., Çengel Y. A., Cimbala, J. M., "Fundamentals and Applications of Renewable Energy", McGraw-Hill, New York, 2020.
- Robert Foster, Majid Ghassemi, Alma Cota, "Solar Energy: Renewable Energy and the Environment", CRC Press Taylor & Francis Group, USA, 2010.
- Vaughn Nelson, "Wind Energy: Renewable Energy and the Environment", Taylor & Francis Group, USA, 2009.
- Solar engineering of thermal process, Duffie John A. & Beckman Williams A., WILEY, 4th ed., 2013
- John Twidell and Tony Weir, "Renewable Energy Resources", 2nd ed., Taylor & Francis, New York, 2006.

Catalog Description:

The course will introduce renewable energy technologies with an emphasis on several renewable energy sources which available in Iraq:- solar energy, hydro-power, wind energy, geothermal energy, biomass and biofuels, their potential and application to power generation. Topics include solar energy principles, solar energy applications, solar thermal applications, water heating, buildings solar thermal applications, concentrated solar thermal energy collection, solar thermal electric power generation; Solar photovoltaic energy principles, solar photovoltaic electric power generation; wind energy site assessment, wind turbine types, wind turbine components, wind electric power generation machinery. Other renewable energy sources will also be introduced, hydro energy applications, geothermal energy, biomass energy, fuel cells. Energy storage and reuse system, as well as the economics of renewable energy applications.

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	Iv	v	vi	vii
√	√					

Course Outcomes:

By the end of this course "Solar Energy MEC422" students will be able to:

1- Define the renewable energy sources;
2- Define many of main terms and symbols in the literatures on renewable energies.
3- Differentiate between traditional and renewable energy sources.
4- Advantages and disadvantages of renewable energy sources,
5- Consequences of fossil fuels combustion on environment.
6- Get a review of basics of solar energy.
7- Classify the applications of solar energy
8- Classify the solar thermal applications
9- Classify the solar collectors and the working principle of each type of them.
10- Classify the solar thermal power generation plants.
11- Understand the working principle of each class of solar power generating plant.
12- Understand the working principle of photovoltaic solar cell (PV cell)
13- Understand the PV arrays and modules.
14- Calculate the generated electricity of a small scale PV system.
15- Classify the solar thermal power generation plants.
16- Know wind energy basics and the classification of wind turbines
17- Know the components of wind turbines.
18- Estimate the output power of some wind turbine.
19- Learn basic of hydro-power generation.
20- Classify the application of hydro-power energy
21- Know the basics of geothermal energy.
22- Know the application of geothermal energy.
23- Learn the biomass and biofuels energy.
24- Know the applications of biomass and biofuels.
25- Know the basics of producing different biofuels.
26- Understand the basics of fuel cell technologies.
27- Know the application of fuel cells
28- Understand different methods of energy storage and reuse
29- Learn the basics of renewable energy economics.

Weekly Teaching Plan:

Week 1 **Oct. 2022**	**Introduction** **-** Orientation/ syllabus review -Traditional energy resources, fossil fuels -Definition of Renewable energy resources, meaning of main symbols -Advantages and disadvantages of their use. -Consequences of fossil fuel combustion
Form projects teams and essay distribution	
Week 2&3	**Solar energy application** -The sun and the solar radiation, - Evaluating Solar energy resource at a given place, -Intensity of solar radiation on any given surface, - Principles of converting solar energy to heat, mechanical and electrical energies. - Solar collectors for hot water supply - Solar thermal mechanical power generation - Solar thermal electrical power generation - Solar photovoltaic power generation
First Quiz	
Week 4	-Solar Photovoltaic energy basics. -Solar PV electric energy system components. -Solar photovoltaic power generation
Second Quiz	
Week 5&6	**Wind energy** -Evaluating resources of wind energy at a given place, -Principles of converting wind energy to mechanical and electrical energies- Technical and design consideration for electric- wind generator
Third Quiz	
Week 7&8	**Hydro energy** Existing technologies and applications
Week 9 &10	**Geothermal energy** Existing technologies and applications
Fourth Quiz	
Week 11 & 12	**Biomass energy and biofuels**: Existing technologies and applications
Semi-Final Exam	
Week 13	**Fuel cells** Existing technologies and applications

Week 14	**Energy Storage/reuse system** Existing technologies and applications
	<mark>Fifth Quiz</mark>
Week 15	**Renewable energy economics**
	<mark>Final Exam</mark>

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 be 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:

Four quizzes	10 pt	Attendance is compulsory and absenteeism of more than 15% of classes will cause grade "NA".
Five Home works	5 pt	
Project Report	5 pt	
Semi-final Exam	20 pt	
Final Exam	60 pt	
Total	100 pt	

Exam's 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 30-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.**

Instructor : Dr. Mahmoud Usamah Jasim (Lecturer)

Room No. : 219 (Mechanical Engineering Department)

E-mail ID : mahmood14@uomosul.edu.iq

Mobile : -------

Last updated : September 2022.

Elasticity
MEC 423

Academic Year	:	**2022-2023**
Credit Hour	:	(2-0-0) 2
	:	
Pre-requisites	:	**Strength of Materials**

Catalog Description:

This course is a general introduction to the theory of elasticity. This is the single most important branch of solid mechanics. It encompasses the mechanical behavior of an enormous variety of engineering and natural materials and provides a template for the formulation of more advanced models of complex material behavior, such as plasticity, growth and thermo-mechanics. The first half of the course is devoted to the nonlinear theory, including the basic concept of elasticity, its relationship to work and energy, the concepts of frame invariance and material symmetry, simple solutions that facilitate correlation of theory with experiment, applications to polymers and bio-tissues, and the concept of elastic stability. The second half of the course emphasizes the linear theory, derived by systematically linearizing the general theory. This is useful in the small-deformation regime characterizing the majority of engineering applications, including wave propagation and vibrations. A wide variety of sophisticated analytical methods are applicable to the linear theory and their coverage constitutes the balance of the course.

Reference Book:

1- **Theory of Elasticity**, S. Tomoshenko and J.N. Goodier, The Maple Press Company, 1951.
2- **Theory of Elasticity and Plasticity**, H.Jane Helena, Eastrn Economy Eidition
3- **Theory of Elasticity and Thermal Stresses**, G. M. L. Gladwell, Springer Volume 197, 2013.
4- **Elasticity in Engineering Mechanics**, Arthur P.Boresi, John wiley & Sons, Inc. 2011.

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Course Outcomes:-

Students will gain a deep understanding of the concepts and methods underlying modern elasticity theory. The course is designed to equip students with the background needed to pursue advanced graduate work in allied fields.

Weekly Teaching Plan:

Week 1 Oct 2022	*Basic concepts– Body force–Surface traction - generalised Hooke's Law*
Week 2&3	*Stresses and strains–Three dimensional stresses and strains–analysis*
Week 4	**(Tutorial sheet No.1** **H.W_1** <mark>**First Quiz**</mark>
Week 5	*transformation equations of 3D stresses & strains– Lame's constant-, , bulk modulus, Shear modulus*
Week 6 &7	*-principal stresses &strains – Mohr's circle -* *States of stresses & strain*
Week 8	**(Tutorial sheet No.2** **H.W_2** <mark>**Second Quiz**</mark>
Week 9	*Equilibrium equations- Compatibility Conditions*
Week 10&11	*Plane stress and plain strain- stress–strain relations–equilibrium equations in Cartesian and polar co-ordinates*
Week 12	**(Tutorial sheet No.2** **H.W_3** <mark>**Third Quiz**</mark>
Week 13	**1st term Examination**
Week 14&15	*Airy's stress function- Saint Venant's principle.*

Final 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.

- *Student must be in class room on time and should brought 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 copy and paste 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.

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Grading Policy:

		Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
three quizzes, (each 3.0 pt)	9 pt	
3 Home works (each 3.0 pt)	9.0 pt	
Mid - term Exam	20.0 pt	
Attendance	2.0 pt	
Final Exam	60pt	
Total	100 pt	

Instructor   : **Dr. Alaa D. Younis (Assistant Professor)**
Room No.   : **217**
E-mail ID   : alaayonis@uomosul.edu.iq
Mobile *:*   **0773-697-7193**
Last updated : August 2022

Co-Instructor   : **Mohammed Tariq**
Romm No.   : **223**
Mobile   **07736977135**
E-mial   mohammed.alabbood.altaee@uomosul.edu.iq

Analysis And Design of Control Systems

ME405

Academic Semester : **Spring (2023)**

Credit hour : **(2-0-1) 4**

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

Class code : :

Pre-requisites : **Control and Measurements**

Reference Books:

➢ Text Book: Automatic Control Engineering by Francis H. Raven, University of Notre Dame.

➢ Modern Control Engineering by K. Ogata, University of Minnesota.

➢ Automatic Control System, by Benjamin Kou, ninth edition, 2010.

Catalog Description:

1. The subject of control and measurements is instructed to the final year, (4th year), in the department of mechanical engineering. The major part of the subject is the so-called classical control, which comprises basics but essential to this wide multidisplinary field. A review of Laplaces transform is given for different function including those normally used in control systems. Reference to different inputs is to be determined for different cases. Routh-Hurwitz stability criterion is applied to characteristic equation of systems. The principle of root locus and their plot are given for feedback control systems. An introduction to polar plot and frequency response are given.

2. As far as, the measurement part is considered it is given in such a way to serve the construction of a complete control system, as the feedback sensors is a sub-system appears as a part of the complete control system. This is because the measurement is a very wide subject. Different measuring devices and sensors for temperature, pressure, flow rate, speed, force … etc., are covered in addition to those given through different control system with different applications.

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) Performance specification of second order system. (i).

2) Understanding of input function (or signal) normally used in control systems, and their Laplace transform. (ii).

3) Determination of system response to specific input functions, and poles and zeros of systems. (i, iv).

4) Examining system stability via its characteristic equation (ii, iv, v).

5) Understanding root-locus methods. (ii, v).

6) Understanding the main components for a measuring device (or sensor). (ii, v).

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

Week 1-2	Introduction to analysis and design of control systems.		
Week 3-4	Laplace Transformation and type of input signals.		
	Tutorial sheet No.1	Homework 1	Quiz
Week 5	Types of roots		
	Tutorial sheet No.2	Homework 2	Quiz
Week 6-7	Transient response, Distinct and repeated roots		
	Tutorial sheet No.3	Homework 3	Quiz
Week 8-10	Transient response, Complex conjugate roots.		
	1st term Examination		
Week 11-12	Steady – state errors and Transient response specifications		
	Tutorial sheet No.4	Homework 4	Quiz
Week 13 -14	Stability		

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Week 15-17	Root Locus
2ⁿᵈ term Examination	
Final Exam	

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.

- 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). ⌷SEP⌷

- 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. ⌷SEP⌷

- 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 notices 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

- All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
- 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.
- The final exam must be completed in order to complete the course.
- Four Quizzes 40-minute duration time, will be arranged with the student's representative.
- Sharing of items during the exams is prohibited (e.g., calculators, rulers, erasers, etc.) under any circumstances.

Instructor: Khalid Elias Hammo

Room No.: 304

Email: khalid1974@uomosul.edu.iq

Laboratories III

ME459

Spring course	:	**2023**
Credit hour	:	**(0-3-0) 1**
Course web page	:	**https://classroom.google.com**
Class code :	:	**3sw4a4q**
Pre-requisites	:	**Laboratories II**

Reference Books:

Data sheets for the experiments. (Can be downloaded from the Course web page).

Catalog Description:

In this course students will be carry out the following experiments:

1. Single-Plane Balancing of Disk-Shaped Rotors.
2. Pneumatic Control Circuits.
3. Articulated arm-robot.
4. Experimental calculation of by-pass factor.
5. The Air-Conditioning Processes.
6. Forced Vibration of a Rigid Body - Spring System with Negligible Damping.
7. Ultrasonic testing.

Students are highly encouraged to maintain a separate laboratory 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. Laboratory attire includes closed-toe shoes are required. Short or loose clothing or loose hair prohibited. In the laboratory, running, jumping, etc. can be potentially dangerous. Each experiment requires a

report, where the students complete this report at the next week. Late submission of report will lead to a decrease in the points of the report.

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) Recognize the various basic terms that is used in robotics, and use the input devices to make the articulated-arm robot move according to previously designed path with recording this motion.(iii,iv,vi,vii)

2) Perform balancing of a disk-shaped rotor using single plane in the site based on vibration amplitude data. (iii,iv,vi,vii)

3) Understand the air conditioning processes, drawing the heating and cooling processes on psychrometric chart, and obtaining the relevant calculations. (iii,iv,vi,vii)

4) Understand the difference between free vibration and vibration under the influence of external forces and calculate the natural frequency of a system practically and theoretically. (iii,iv,vi,vii)

5) Organize and write a technical report which communicates scientific information in a clear and concise manner. (iii,iv,vi,vii)

6) Understanding the meaning of contact factor and by pass factor and the amount of air that does not touching the surfaces of the tubes in the condenser and evaporator in the refrigeration cycle. (iii,iv,vi,vii)

7) Understand all the components of the pneumatic control circuits, in addition to mastering the symbols for each part, the method of its work, and its location in the circuit, which qualifies to build circuits that operate with this system. (iii,iv,vi,vii)

Weekly Teaching Plan: February 19, 2023, to July 1, 2023

Week 1&2	Registration of students on the course.

Week 3&4	Introduction, Dividing Students into Groups
Week 5	**Vibration laboratory**
	Single-Plane Balancing of Disk-Shaped Rotors.
Week 6	**Control laboratory**
	Pneumatic Control Circuits.
Week 7	**Control laboratory**
	Articulated arm-robot.
Week 8	**Air conditioning laboratory**
	Experimental calculation of by-pass factor.
Week 9	**Air conditioning laboratory**
	The Air-Conditioning Processes.
Week 10	**Vibration laboratory**
	Forced Vibration of a Rigid Body - Spring System with Negligible Damping.
Week 11	**Metallurgy laboratory**
	Ultrasonic testing.
Week 12-14	Re-Conducting a Part of the Experiments for the Licensed Students
Week 15	**Exam**
Week 16	**Final exam**

Grading Policy:

Reports	20pt	**Note:** Attendance is compulsory, and absence leads to a zero attendance mark.
Attendance	10pt	

Exam	30pt	
Final Exam	40pt	
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 course 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

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> ➢ Sharing items with other students in the exam is prohibited
>
> ➢ The final exam must be completed to complete the course.

Instructor: Dr. Saddam Atteyia Mohammad

Room No.: 218

Email: saddamatteyia@uomosul.edu.iq

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<u>اسماء التدريسيين في مادة المختبرات 3</u>

م. محمد طارق

م.م. ياسر شكر

م. احمد نافع

م.م. ايمان محمد

م.م. عرب غازي

م.م. ماجد مدحت

م. محمد شعلان

</div>

Air Conditioning

MEC453

Fall course	:	**2023**
Credit hour	:	**(2-0-1) 3**
Course web page	:	https://classroom.google.com
Class code :	:	**i66tahh**
Pre-requisites	:	**Heat transfer, Fluid**

Reference Books:

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

Catalog Description:

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

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) Describing the air conditioning systems (i).
2) knowing the properties of air (ii).
3) Knowing the ducting design (i,iv).

4) Understand the air conditioning cycles (iv,i).

5) Understand how to calculating the cooling load (iv,v).

6) Understanding the air mixing (ii).

7) Knowing the air conditioning process and applications (ii,v).

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

Week 1-2	Introduction + Properties of moist air(dry bulb temperature , wet bulb temperature, Enthalpy and specific volume) and Psychrometer
Week 3-4	Measuring and selecting factors involved in determination of thermal comfort condition, globe temperature, operative temperature, mean radiant temperature, predicted mean vote index, adjustment of operative temperature, estimating clothing insulation and activity level, outdoor design conditions, thermal comfort chart.
	Tutorial sheet No.1 Homework 1 Quiz
Week 5-6	Psychrometric chart, calculating moist air properties by psychrometric chart and by perfect gas law formulations, energy analysis in any AC process.
	Tutorial sheet No.2 Homework 2 Quiz
Week 7-9	Appling mass and energy balance on any A/C process, sensible heating, sensible cooling, cooling and dehumidification, coil bypass factor and efficiency, humidification, air washer, dehumidification, cooling tower. Room sensible heat line, Heating/ Cooling A/C cycles including:- 100% return air A/C cycle, 100% fresh air A/C cycle, Mixing return and fresh air A/C cycle
	Tutorial sheet No.3 Homework 3 Quiz
	1st term Examination
Week 10-12	Environmental freshness & supply design condition
	Tutorial sheet No.3 Homework 3 Quiz
Week 13 -15	**Heating and Cooling Load Calculations** (Proper selection of indoor air conditions & outdoor conditions, internal and externalair conditioning load sources, heating load, cooling load by CLTD method. Estimating required ventilation rate, Estimating the infiltration rate
	Tutorial sheet No.4 Homework 4 Quiz
Week 16	Types of ducting system, pressure drop and friction factor, method of calculatingdimensions of ducting system.
	Tutorial sheet No.5 Homework 5 Quiz
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	10pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Attendance	5pt	
Participation	5pt	
1st 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.

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: Ziad Mohammed Majeed

Room No.: 116

Email: ziadalmakhyoul@uomosul.edu.iq

Pollution

MEC460

Spring course	:	**2023**
Credit hour	:	**(2-0-0) 2**
Course web page	:	https://classroom.google.com/c/NTk2Nzc2ODMxMzM1
Class code :	:	qa245rm
Pre-requisites	:	**Introduction to Combustion**

Reference Books:

➢ Introduction to environmental engineering and science, Third Edition, Gilbert M. Masters Wendell P. Ela, PEARSON

➢ Air Pollution, M.N. RAW, H.V.N. RAW S. Tata McGraw-Hill

Course Description

This undergraduate air pollution course is designed to provide students with a broad understanding of air pollution science and management, including environmental engineering principles, risk assessment, and ethical considerations. The course covers the sources and types of air pollutants, their effects on human health and the environment, and regulatory frameworks for air pollution control. In addition, the course focuses on material balance for pollution concentration, air pollution measurement and modeling, control technologies, and emerging issues in air pollution. Through examples of calculations, case studies, and group projects, students will develop practical skills for addressing air pollution challenges in various industries and contexts. Overall, this course aims to equip students with the knowledge and tools needed to make a positive impact on air quality and public health.

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) Environmental engineering (i).
2) Environmental Ethics (i).
3) Environmental Risk Analysis (i,ii).
4) Material balance, calculation of pollution concentrations   (i,iii).
5) Inspect the stability of mechanical systems (ii).
6) Outlining suitable isolation parts to reduce the effect of vibrations (ii).

1. جدول بمفردات المنهج والاسابيع المخصصة لكل موضوع

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

Week 1	Introduction to Pollution Sources and types of pollutants Effects of pollution on human health and the environment Regulatory frameworks for pollution control
Week 2-3	Introduction to Environmental Engineering, Environmental Ethics, Environmental Risk Assessment
Week 4-5	Material Balance for Pollution Concentration Mass balance equations and calculations Application to air pollution sources and control measures
	Homework 1 Quiz
Week 6-7	Air Pollution Measurement Monitoring techniques and equipment Sampling and analysis of air pollutants Quality assurance and quality control
Week 8- 9	Air Pollution Modeling Overview of air pollution modeling Types of models and their applications Case studies in air pollution modeling
	1st term Examination

Week 10-11	Air Pollution Control Technologies Overview of air pollution control technologies Selection and design of control measures Cost-benefit analysis of pollution control options		
Week 12 -15	Indoor Air Quality Sources and types of indoor air pollutants Effects on human health and comfort Control measures and mitigation strategies		
	Tutorial sheet No.5	Homework 5	Quiz
Week 16-17	Emerging Issues in Air Pollution Emerging pollutants and sources Climate change and air pollution Future directions in air pollution research and management		
	2nd term Examination		
Final Exam			

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	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/c/NTk2Nzc2ODMxMzM1

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. Mohammed Saleh Mohammed

Room No.: 114

Email: moh62sam@uomosul.edu.iq

Refrigeration

MEC461

Spring course	:	**2023**
Credit hour	:	**(2-0-0) 2**
Course web page	:	https://classroom.google.com
Class code :	:	**pxha7pd**
Pre-requisites	:	**Thermodynamic**

Reference Books:

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

Catalog Description:

This course represents the details of refrigeration system components and also including defining the refrigeration, principle of obtaining refrigeration effect, Vapor Compression cycles refrigeration, Multi-stage compressors, basic and auxiliary components of refrigeration system, absorption system and types of refrigerants and designations it.

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) Describing the vapoure compression cycle (i).
2) Knowing the Multi-stage compressors and applications (ii).

3) Knowing the basic thermodynamics for cycles (i,iv).

4) Understand the types of refrigerants (iv,i).

5) Understand the (Ton) of refrigeration (iv,v).

6) Understanding the type of compressors (ii).

7) Knowing the applications of absorption systems (ii,v).

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

Week 1-2	Defining refrigeration, classification of methods of obtaining refrigeration effect, practical methods
Week 3-4-5	Reversed Carnot cycle, Coefficient of performance (COP), drawbacks of Carnot cycle, Reversed Rankin cycle (basic refrigeration cycle), and methods of improving performance of vapor compression cycle.
	Tutorial sheet No.1 Homework 1 Quiz
Week 6-7-8	Multi- evaporators, Multi- compressors with inter-cooling, Cascade cycles.
	Tutorial sheet No.2 Homework 2 Quiz
Week 9-10	Type of Compressors
	Tutorial sheet No.3 Homework 3 Quiz
	1st term Examination
Week 11-12	Refrigerants and its designate
Week 13 -15	Absorption systems: Aqua-Ammonia system, Lithium bromide system
Final Exam	

Grading Policy:

Home works	5pt	
Quizzes	10pt	**Note:** Attendance is compulsory, and absence from more than five lectures leads to a zero attendance mark.
Attendance	5pt	
Participation	5pt	
1st 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.

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: Ziad Mohammed Majeed

Room No.: 116

Email: ziadalmakhyoul@uomosul.edu.iq

Computer Aided Machines Design

MEC464

Academic Semester	:	**Spring (2023)**
Credit hour	:	**(2-0-1) 2**
Course web page	:	**https://classroom.google.com**
Class code :	:	
Pre-requisites	:	Intermediate Machine Design

Reference Books:

➤ Shigley's Mechanical Engineering Design, 10th edition. R. G. Budynas and J. K. Nisbett. 2015.

➤ Machine Elements in Mechanical Design, 6th edition. Robert L. Mott, Edward M. Vavrek and Jyhwen Wang, Pearson Prentice Hall. 2018.

➤ Autodesk Inventor Help.

Catalog Description:

1. The subject of Computer aided machine design is instructed to the final year, (4th year), in the department of mechanical engineering. The major part of the subject is use inventor software to design of machine. A review of computer aided mechanical drawing in two and three dimensions. Introduction to the inventor software solving simple problems such as, cantilever and simply supported beams with different cross-sectional area and different types of loads to find deflection, deformation, stresses, …. etc. design of power screw, design of gears, design of clutches and hydraulic press.

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) Modeling of most of machine parts using Autodesk software. (i).
2) Recognize type of stresses. (ii).
3) Determination of stresses that induced in most machine parts due to different load conditions. (i, iv).
4) Design of power screw (ii, iv, v).
5) Design of clutches. (ii, v).
6) Design of hydraulic press. (ii, v).

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

Week 1-2	Induction to the AutoCAD software.	
Week 3-4	Introduction to the inventor software.	
Week 5	Solve simple problems of cantilever beams	
		Quiz
Week 6-8	Design of power screw	
	Tutorial sheet No.3	Quiz
Week 9-11	Design of gear using inventor program	
	1st term Examination	
Week 12-14	Design of clutches	
	Tutorial sheet No.4	Quiz
Week 15 -16	Design of hydraulic press	
	Final Exam	

Grading Policy:

Quizzes	15pt	
Attendance	5pt	
Participation	5pt	
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). ᶳᴱᴾ

- 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. ᶳᴱᴾ

- 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.

University of Mosul

Mechanical Engineering Department

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 notices 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

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 Four Quizzes 40-minute duration time, will be arranged with the student's representative.

o Sharing of items during the exams is prohibited (e.g., calculators, rulers, erasers, etc.) under any circumstances.

Instructor: Sufyan A. Mohammed

Room No.: 104

Email: Ssufyan.A.mohammed@uomosul.edu.iq

Co-Instructor: Khalid Elias Hammo

Room No.: 304

Email: khalid1974@uomosul.edu.iq

Co-instructor: Emad Hazem

Room: 104

Computer Aided Thermal System DesignI

MEC463

Spring course	:	**2023**
Credit hour	:	**(2-2-1) 3**
Course web page	:	**https://classroom.google.com**
Class code :	:	3i54lbr
Pre-requisites	:	**Air Conditioning**

Reference Books:

➢ Design of thermal system , W.F. Stoecker ,1989, McGraw- Hill company.

➢ Design and Optimization of thermal system with Matlab Application, 3rd Edition, Yogesh Jaluria, 2020, Tayler & Francis Group

➢ Thermal Design and Optimization , John Wiley & Sons.

Catalog Description:

Course Description:

The knowledge of basic step of engineering design, engineering undertaking decisions and the steps included to make a decision by an engineer. Design a workable system and compare with optimum system which is a preliminary to the study of optimum system. Modeling thermal system using physical insight, then study of heat exchanger as a basic component of thermal system including different cases of the design and the effectiveness and the NTUS. The System summation, the uses of it, classes of simulation, information flow diagrams, two methods of simulation, the successive substitution and Newton- Raphson methods. Optimization, its levels, mathematical representation of optimization problems, Optimization procedures. Lagrange Multipliers (Calculus method), unconstrained optimization, constrained optimization using Lagrange Multipliers equations, sensitivity coefficient. Search methods - Single variable (exhaustive search, efficient – Dichotomous and Fibonacci methods – Multivariable unconstrained (Lattice, Univariate and Steepest ascent – decent method)- Multivariable , constrained (Penalty functions, Search along a constraint). Linear Programing.

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) Knowing the basic of engineering design and decision undertaking.
2) Knowing the difference between workable and optimum systems.
3) Modeling thermal system using physical insight and study of heat exchanger as a basic component of thermal system including different cases of the design.
4) Know the fundamental concepts of simulation and optimization.
5) To be able to use simulation and do computer programs to simulate some systems.
6) To know the basic of optimization and study some methods of optimization .

7) 7-Do some computer programs for solving problems in different method of simulations optimization..

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

Week 1-2	Engineering Design
Week 3-4	Designing a workable system
	Modeling Thermal system 1
Week 5-7	Homework1 Modeling Thermal system 2.
	Tutorial sheet No.1 Homework 2 Quiz
Week 8	Mid-Term Exam
Week 9	System Simulation 1
	System Simulation 2
	1st term Examination
Week 10-11	Optimization Lagrange Multipliers 1 Lagrange Multipliers 2
	Tutorial sheet No.4 Homework 4 Quiz
Week 12 -15	Search Method 1 Search Method 2
	Tutorial sheet No.5 Homework 5 Quiz
Week 16-17	Design of Pipe Network and Pump selection
	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(Theory and Practical)	20pt	
2nd term Exam (Theory and Practical)	20pt	
Final Exam	40pt	
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 design of thermal system 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. Younis Najim

Room No.: 202

Email: mahalyounis@uomosul.edu.iq

Assessment tools for MEC201		ملاحظات	i	ii	iv	v	SUM	نسبة
Home works	5pt							
HW1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الواجب ؟		■				
HW2	1pt			■				
HW3	1pt			■				
HW4	1pt			■				
HW5	1pt					■		
Quizzes	5pt	ما المحصل التعليمي المستهدف تحقيقه من الامتحان القصير ؟						
Q1	1pt		■					
Q2	1pt		■					
Q3	1pt			■				
Q4	1pt				■			
Q5	1pt				■			
1st term Exam	10pt	ما المحصل التعليمي المستهدف تحقيقه؟	■	■	■	■		
2nd term Exam	15pt		■	■	■	■		
Final Exam	60pt		■	■	■	■		
Particiption+ Attendance	5 pt							
Total	100pt		■	■	■	■		

Mosul University

Mechanical Engineering Department

INTERMEDIATE VIBRATION

MEC467

Spring course	:	**2023**
Credit Hour	:	**(2-0-1) 4**
Course web page	:	**https://classroom.google.com**
Class code :	:	
Pre-requisites	:	**Introduction to vibration**

Reference Book:

➢ Engineering Vibrations, William J. Bottega, 2013, Taylor & Francis Group, LLC, USA.

➢ Mechanical Vibrations, Singiresu, S. Rao, fourth (Revised), 2005, Prentice-Hall, NJ, USA.

➢ Mechanical vibrations, ANIL V. RAO, 2009, University of Florida, USA.

Catalog Description:

This course provides the dynamic behavior of vibratory systems under deterministic and random motions. The degrees of freedom and generalized coordinates are taught. Different types of vibratory systems are classified and illustrated as:

➢ Multi-degree of freedom systems.

➢ Stability of the vibratory systems.

➢ Vibration measuring instruments.

➢ Vibration isolation.

➢ Vibration control.

The mathematical models of the physical systems are explained, and the dynamic behavior of the vibratory systems based on initial conditions is analyzed analytically. Newton's law, energy, and equivalent methods are used for fully solved examples, emphasizing real-world applications. Also, the stability of systems and vibration-measuring instruments are described.

Mosul University

Graduate outcomes (GOs) addressed by the course:

i	ii	iii	iv	v	vi	vii
✓	✓		✓	✓		

4. الاهداف التعليمية للمقرر الدراسي. يرجى الاطلاع على الملحق

Course Outcomes:

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

1) Describing the degrees of freedom and generalized coordinates.
2) Using different methods to derive EOM of multi-degree of freedom systems.
3) Explaining the dynamic response of the systems.
4) Understand vibration measuring instruments.
5) Inspect the stability of mechanical systems.
6) Outlining suitable isolation parts to reduce the effect of vibrations.

5. جدول بمفردات المنهج والاسابيع المخصصة لكل موضوع

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

Week 1-2	Review the behavior of vibratory systems under external excitation
Week 3-4	Vibration under general forcing conditions
	Tutorial sheet No.1 Homework 1 Quiz
Week 5-7	Free un-damped vibration of two degrees of freedom system. Derive the equation of motion. Study the dynamic behavior of the system based on initial conditions.
	Tutorial sheet No.2 Homework 2 Quiz
Week 8	Free damped vibration of two degrees of freedom system.
	Tutorial sheet No.3 Homework 3 Quiz
Week 9	Forced un-damped vibration of two degrees of freedom systems.
	1st term Examination
Week 10-11	Forced damped vibration of two degrees of freedom systems.
	Tutorial sheet No.4 Homework 4 Quiz

Week 12 -15	Vibration isolation.
	Vibration measuring instruments.
	Tutorial sheet No.5 Homework 5 Quiz
Week 16-17	Vibration control.
	Examples of modern applications
	2nd term Examination
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	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.

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. Omar Jumaah

Room No.: 314

Email: omarjumaah@uomosul.edu.iq

Mosul University

Mechanical Engineering Department

Graduate Outcomes	محصلات الخريجين : يرجى قراءة ملف البوربوينت	**1**
Course learning outcomes	الاهداف التعليمية للمقرر الدراسي : يرجى قراءة ملف البوربوينت	**2**
	طريقة توزيع الدرجات : يرجى قراءة ملف البوربوينت والمثال التالي	**3**
	الحافظة : تحتوي جميع الملفات المتعلقة بالمقرر جاهزة للتدقيق	**4**

1. المطلوب يحدد الاستاذ عدد المخرجات التي ممكن تحقيقها خلال الفصل الدراسي على الاقل 2 من المخرجات باستثناء مشروع التخرج والذي يجب ان يحقق جميع المخرجات ان امكن.

2. الاهداف التعليمية المتوقع من الطالب الحصول عليها بعد اجتيازه للمقرر بنجاح يتم صياغتها حسب تصنيف بلوم

3. اضافة لما ذكر اعلاه يتم اتباع نفس الاجراء وتحديد المخرجات المتوقع تحقيقها في كل امتحان او واجب بيتي او امتحان قصير كما موضح في المثال التالي. وكذلك عمل احصائية لبيان مدى المخرجات المتحققة اعتماداً على نسبة النجاح لكل عمل ((واجب , امتحان , الخ)).

Assesment tools for ME414								
		ملاحظات	**i**	**ii**	**iv**	**v**	**SUM**	نسبة النجاح
Home works	**5pt**							
HW1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الواجب ؟		1			1	70 %
HW2	1pt			1			1	80 %
HW3	1pt				1		1	80 %
HW4	1pt				1		1	80 %
HW5	1pt					1	1	70 %
							5 pt	3.8 pt
Quizzes	**5pt**						1	
Q1	1pt	ما المحصل التعليمي المستهدف تحقيقه من الامتحان القصير ؟	1				1	50 %
Q2	1pt		1				1	60 %
Q3	1pt			1	1		1	40 %
Q4	1pt				1		1	40 %
Q5	1pt				1			30 %
							5 pt	2.2 pt
1st term Exam	**10pt**	ما المحصل التعليمي المستهدف تحقيقه؟	2	2	3	3	10 pt	5 pt
2nd term Exam	**15pt**		4	2	4	5	15 pt	9 pt
Final Exam	**60pt**		10	15	20	15	60 pt	45 pt
Particiption+ Attendance	**5 pt**						5 pt	5 pt
Total	100pt		14	20	31	24	100pt	64 pt