Academic Program Description

University Name: **Mosul University**

Faculty/Institute: **Engineering**

Scientific Department: **Mechatronics**

Academic or Professional Program Name: **Bachelor's degree in Mechatronics**

Final Certificate Name: **Bachelor of Science**

Academic System: **Courses**

Description Preparation Date: **2023–2024**

File Completion Date: **7/4/2024**

Signature:

Head of Department Name:

Date:

Signature:

Scientific Associate Name:

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Approval of the Dean

1. Program Vision

To offer a world-leading research and educational mechatronics program with an emphasis on hands-on oriented training.

2. Program Mission

Contribute to the advancement of engineering and tech logical reality, students' acquisition of theoretical and practical experience, communication skills and outstanding teamwork.

3. Program Objectives

1. Successfully adapt to new situations in their professional careers within the global job market, by using the essential tools and fundamental background of the disciplines of Mechatronics Engineering in the areas of Electric and electronics sciences, computer sciences, Thermal and Fluid Sciences, Material Science, Machine Design and Production Engineering, robotics, communication, artificial intelligence, and automation; Or pursue additional degrees through graduate studies.

2. Apply design methodology in relation to mechatronics engineering, by incorporating the use of design standards, realistic constraints, and consideration of the eco mic, environmental, and social impact of the design.

3. Engage in professional service such as participation in professional societies, and to always consider and support professional ethics.

4. have a constant desire for professional development through life-long learning activities, self-confidence, creativity and leadership.

4. Program Accreditation

Applied for program accreditation (under review)

5. Other external influences

Higher-level decisions

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	Compulsory: 8 Selective: 5	Compulsory: 17 Selective: 10	Compulsory: 62.5 Selective: 37.5	
College Requirements	Compulsory: 7 Selective: 4	Compulsory: 14 Selective: 10	Compulsory: 60 Selective: 40	
Department Requirements	Compulsory: 33 Selective: 11	Compulsory: 84 Selective: 24	Compulsory: 77 Selective: 23	
Summer Training	1			
Other				

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
First			theoretical	practical
	UOMCl0l	English Language	3	
	UOMC102	Computer	2	2
	ENGC121	Calculus 1	3	
	ENGC123	Engineering Drawing		3
	ECANl00	Electrical circuit analysis	2	2
	EMSA101	Engineering Mechanics 1	3	
	PHY102	Physics	2	
	UOMCl00	Arabic Language	2	
	UOMC103	Rights and Freedoms	2	
	ENGC122	Calculus 2	3	
	ENGC124	Auto-CAD		3
	STMT150	Strength of Materials	2	
	ALCP151	Algorithm & Computer programming	1	2

	ENMMl52	Engineering Materials & Manufacturing processes	**3**	**2**
Second	UOMCI04	Professional Ethics	**2**	
	ENGC227	Statistics	**2**	
	ENGE228	Engineering Math 1	**3**	
	EMDY201	Engineering Mechanics 2	**2**	
	ELMA202	Electrical Machine	**2**	**2**
	THHT203	Thermodynamic & heat transfer	**2**	
	ELCP204	Electronic Principles	**2**	**2**
		English Language - Pre Intermediate	**1**	
	ENGC226	Engineering Eco mics	**2**	
	ENGE230	Engineering Math 11	**3**	
	FLME251	Fluid Mechanics	**2**	
	DILO252	Digital Logic	**2**	**2**
	ELES253	Electromechanical system	**2**	**2**
	SISY254	Signal & Systems	**2**	
	AHTR263	Advanced heat transfer	**3**	
Third		English language - Intermediate	**2**	
	ENGE320	Numerical analysis	**2**	
	MEVI300	Mechanism & Vibration	**2**	
	MLAB301	Mechanical Eng. Lab.		**2**
	MODS302	Modeling and Simulation	**1**	**2**
	MEIN303	Measurements and lnstrumentation	**2**	**2**
	MICA304	Microprocessors & Assembly Language	**2**	**2**
	SPRO361	Signal processing	**3**	
	IMPR362	Image processing	**3**	
	DMEL350	Design of Machine Elements **I**	**3**	
	PELD351	Power Electronics & Drive	**2**	**2**
	CONS352	Control Systems	**2**	**2**
	MCSD353	Microcontroller system design	**2**	**2**
	THMH354	Theory of Machine	**2**	

	HPNS355	Hydraulic and Pneumatic Systems	**2**	
	SMOD363	Solid Modelling	**3**	
	COEN365	Communication Engineering	**3**	
Fourth	ENGE429	Public Safety	**2**	
	ROTI400	Robotics	**2**	**2**
	DMEL401	Design of Machine Elements II	**3**	
	MOCS402	Modern Control Systems	**2**	**2**
	STME461	Special topics in Mechatronics	**3**	
	PCID464	PC Interface and Data Acquisition	**2**	**2**
		English language - Upper Intermediate	**2**	
	ENGC425	Engineering Management	**2**	
	MTSD450	Mechatronics Systems Design	**2**	**2**
	INAU451	Industrial Automation	**2**	**2**
	ARIN453	Artificial intelligent	**2**	
	ICON464	Intelligent Control	**3**	

8. Expected learning outcomes of the program

K wledge	
A1	An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.
A2	An ability to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.
Skills	
B1	An ability to create and carry out proper measurements and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences.
B2	An ability to skillfully communicate orally with a gathering of people and in writing with various managerial levels.
B3	An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble, and apply it properly.
B4	An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty.
Ethics	

C1	An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological, and societal considerations.

9. Teaching and Learning Strategies

- Theoretical lectures
- Discussion sessions
- Laboratory experiments
- Computer laboratories
- Projects
- Industrial training

10. Evaluation methods

- Semi-term and final exams
- Short exams
- Reports
- Practical exams
- Presentations

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff (27)	Lecturer
Assistant Professor	Electrical engineering	intelligent control systems			✓	
Assistant Professor	Electrical engineering	Intelligent Systems			✓	
Assistant Professor	Mechanical Engineering	Mechatronics Engineering			✓	

Assistant Professor	Mechanical Engineering	Numerical Thermal Forces			✓	
Assistant Professor	Mechanical Engineering	Thermal Forces			✓	
Assistant Professor	computer engineering	Artificial intelligence in signal processing			✓	
Lecturer	Electrical and Electronic Engineering	Electrical and Electronic Engineering			✓	
Lecturer	Computer Engineering	Computer Engineering			✓	
Lecturer	Computational Intelligence	Computational Intelligence			✓	
Lecturer	Electrical Engineering	Control			✓	
Lecturer	Computer Engineering Techniques	Control			✓	
Lecturer	Mechanical engineering	fluid mechanics and nano applications			✓	
Lecturer	Electronics Systems Engineering	Electronics Systems Engineering			✓	
Lecturer	Electrical Engineering	Electronics Capacity			✓	
Lecturer	Control and Computer Engineering	Control and Computer Engineering			✓	
Lecturer	Electrical and Electronic Engineering	Electronic Engineering			✓	
Lecturer	Mechanical Engineering	Robotics and Control			✓	
Lecturer	Mechanical Engineering	Applied Mechanics			✓	
Assistant Lecturer	Computer Science	Computer Networks			✓	

Assistant Lecturer	Computer sciences	systems and informatics			✓	
Assistant Lecturer	Communication engineer	Communication engineer			✓	
Assistant Lecturer	Electrical	communication engineer			✓	
Assistant Lecturer	Electronics and Communications Engineering	Electronics			✓	
Assistant Lecturer	Civil Engineering	Construction			✓	
Assistant Lecturer	Electrical engineering	Control engineering			✓	
Assistant Lecturer	Mechanical engineering	Thermal			✓	
Assistant Lecturer	Computer engineering and information	Artificial intelligence and image processing			✓	
Assistant Lecturer	Computer Engineering	Information Engineering			✓	

Professional Development

Mentoring new faculty members

Attending scientific conferences, participating in training courses, and participating in teaching methods courses followed by a teaching qualification course.

Professional development of faculty members

Attending scientific conferences and participating in training courses

12. Acceptance Criterion

1- Central distribution by the Ministry of Higher Education determines those accepted into the College of Engineering.

2- The departments select who are accepted, where competition takes place between them based on the total marks - in addition the total of the differentiation lessons.

3- Transfers from other departments and institutions are allowed subjected to higher regulations and instructions.

13. The most important sources of information about the program

The program developed through sources

Higher directives

What is emerging from science in the field of specialization

14. Program Development Plan

Obtaining modern sources

Conduct internal seminars

Program Skills Outline										
				Required program Learning outcomes						
Year/Level	Course Code	Course Name	Basic or optional	Knowledge		Skills				Ethics
				A1	A2	B1	B2	B3	B4	C1
First	ECANl00	Electrical circuit analysis	Basic	X		X		X	X	
	UOMC123	Engineering drawing	Basic	X		X	X		X	
	ENGC124	AutoCAD	Basic	X	X				X	
	EMSA101	Engineering Mechanics I	Basic	X		X			X	
	ENMM152	engineering materials and manufacturing processes	Basic	X	X	X	X	X	X	X
	UOMC101	English language	Basic				X	X	X	
	PHY102	Physics	Basic	X					X	X
	UOMC121	Calculus I	Basic	X				X		
	UOMC102	Computer	**Basic**							

	UOMCl00	Arabic Language								
	UOMC103	Rights and Freedoms								
	ENGC122	Calculus 2		X				X	X	
	STMT150	Strength of Materials		X	X	X	X	X		X
	ALCP151	Algorithm & Computer programming		X	X	X		X	X	
Second	ELCP204	Electronic Principles	Basic	X	X	X			X	
		English Language Pre - Intermediate	Basic	x			x		x	
	ENGC226	Engineering Economics	Optional	x	x			x		
	THHT203	Thermodynamic and heat transfer	Basic	x	x				x	

	AHTR263	Advanced heat transfer	Optional	x	x				x	
	ELMA202	electrical machine	Basic	x		x		x	x	
	ELES253	electromechanical systems	Basic	x	x	x		x	x	
	DILO252	Digital Logic	Basic	x	x	x	x	x	x	
	Engc227	Statistics	Optional	x	x	x			x	x
	SISY254	Signals and Systems	Basic	x	x		x	x		
	UOMCI04	Professional Ethics								
	ENGE228	Engineering Math 1		x		x		x		
	EMDY201	Engineering Mechanics 2		x	x			x	x	
	ENGE230	Engineering Math 11		x				x	x	
	FLME251	Fluid Mechanics		x	x			x		

Third	MODS302	Modeling and Simulation	Basic	x	x	x		x	x	
	DMEL350	Design of Machine Elements I	Basic	x	x		x	x	x	x
	SMOD363	Solid Modeling	Optional	x	x	x	x	x	x	
		English Language Intermediate	Basic	x			x			
	MEVI300	Mechanisms and Vibration	Basic	x	x			x	x	
	THMH354	Theory of Machines	Basic	x	x			x	x	
	HPNS355	Hydraulic and Pneumatic Systems	Basic	x	x		x	x		
	PELD351	Power Electronics & Drive	Basic	x	x	x		x	x	
	SPRO361	Signal Processing	Basic	x	x			x	x	x
	COEN365	Communication Engineering	Optional	x	x			x	x	x

	MEIN303	Measurement and Instrumentations	Basic	x	x	x		x		
	MCSD353	Microcontroller Systems Design	Basic	x	x	x		x	x	
	CONS352	Control Systems	Basic	x	x	x			x	
	ENGE320	Numerical analysis		x				x		
	MLAB301	Mechanical Eng. Lab.		x		x	x		x	
	MICA304	Microprocessors & Assembly Language		x	x	x				
	IMPR362	Image processing		x		x		x	x	
Fourth	ARIN453	Artificial Intelligence	Basic	x	x				x	x
	ROTI400	Robotics	Basic	x	x	x		x	x	
	NGC425	Engineering Management	Basic	x	x				x	
	ICON464	Intelligent control	Basic	x	x	x			x	

	PCID464	PC Interface and Data Acquisition	Optional	x	x	x				
	INAU451	Industrial Automation	Basic	x	x	x				
	DMEL401	Design of machine elements II	Basic	x	x	x	x	x	x	x
	MTSD450	Mechatronics System Design	Basic	x	x	x		x		
		English Language Upper Intermediate	Basic				x	x	x	
	MOCS402	Modern Control Systems	Basic	x	x	x			x	
	ENGE429	Public Safety								
	STME461	Special topics in Mechatronics		x	x	x		x	x	x

Course Description / First level

1. Course Name:
Engineering Mechanics (statics)
2. Course Code:
EMSA101
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Zahraa Reyad Mahmood E-mail: zahraa.reyad@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) Recognize various types of Forces, their components, and the function of each component [I, II]. 2) Identify the types of moments and the methods used to calculate them [II, III, IV]. 3) Distinguish between different types of frictional forces [II, III, IV, V]. 4) Familiarity with the position of equilibrium and the equations used in the subject [II, IV, V, VI]. 5) Identify the methods used to find the center of geometric shapes [II, VI].

9. Teaching and Learning Strategies

Strategy	• Theoretical lectures • Discussion sessions • Assignments • Quizzes

10. Course Structure

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

1	3	I	Introduction – concept for the analysis method in engineering mechanic	Theoretical lectures	Discussion
2	3	I	Forces system	Theoretical lectures	Quiz
3	3	I	Resultant for forces	Theoretical lectures	Discussion
4	3	I	Moment for forces	Theoretical lectures	Assignment
5	3				
6	3	I	Couple moment	Theoretical lectures	Discussion
7	3				
8	3	I, II	Mid-term exam		Mid-term exam
9	3		Equilibrium of force	Theoretical lectures	Discussion
10	3				
11	3	I, II	Friction of force	Theoretical lectures	Assignment
12	3				
13	3	I, II, VI	Centroid of area	Theoretical lectures	Quiz
14	3				
15	3	I, II, IV, V, VI	Final exam		Final exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs		
				I	II	VII
Assignment & Grading	Activities	2	5%		7	3
	Assignment	3	5%		7	3
	Quiz	4	10%	10		
	Midterm exam	1	20%	10		
	Final exam	1	60%	60		
Total Marks			100%	80	14	6
GOs %				100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Engineering Mechanics, STATICS , J. L. Meriam L. G. Kraige Virginia Polytechnic Institute and State University, 7th Edition,. Volume1.
Main references (sources)	• Engineering Mechanics: Statics 5th Edition by Anthony Bedford (Author), Wallace Fowler (Author). • Vector Mechanics for Engineers: Statics, 12th Edition by Ferdinand Beer, E. Johnston, David Mazurek, Phillip Cornwell and Brian Self.

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Engineering Materials and Manufacturing Processes

2. Course Code:

ENMM152

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Present

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

5/4

7. Course administrator's name

Name: Ahmad Wadollah S.Al-Sabawi
Email : ahmadalsabawi@uomosul.edu.iq

8. Course Objectives

Course Objectives	1. Link to GO I, II and VI Understand basic concepts of material machining and formation. Gain a quick information for the available engineering CAM packages those required for obtaining the suitable strategies for machining. 2. Link GO II, III and V Exposed to the basic and available machining systems such as milling, turning, drilling, andgrinding machines. Learn and gain engineering morals and ethics.

9. Teaching and Learning Strategies

Strategy	Theoretical lectures Discussion sessions Laboratory experiments

10. Course Structure

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

		Outcomes			
Week1	**5**	**I, II, III, V and VI**	Basic concepts and definitions	**Lectures**	
Week2	**5**	**I, II, III, V and VI**	Mechanical properties of materials: Fundamental tests I (Tensile Test)	**Lectures**	**quiz**
Week3	**5**	**I, II, III, V and VI**	Fundamental tests II (Compression Test and Impact Test)	**Lectures**	**hw**
Week4	**5**	**I, II, III, V and VI**	Fundamental tests III (Hardness Test)	**Lectures**	**quiz**
Week5	**5**	**I, II, III, V and VI**	Dimensions, measurements and measuring devices and Tolerances	**Lectures**	**hw**
Week6	**5**	**I, II, III, V and VI**	Engineering materials Part I	**Lectures**	
Week7	**5**	**I, II, III, V and VI**	Engineering materials Part II	**Lectures**	
Week8	**5**	**I, II, III, V and VI**	Cutting theory	**Lectures**	
Week9	**5**	**I, II, III, V and VI**	Mid-Term Examination	**Lectures**	
Week10	**5**	**I, II, III, V and VI**	Material removal processes (Lathe and its related operations)	**Lectures**	

Week11	**5**	**I, II, III, V and VI**	Material removal processes (Boring and drilling)	**Lectures**	**quiz**
Week12	**5**	**I, II, III, V and VI**	Material removal processes (Milling) 1	**Lectures**	**hw**
Week13	**5**	**I, II, III, V and VI**	Material removal processes (Milling) 2	**Lectures**	
Week14	**5**	**I, II, III, V and VI**	Introduction to non – traditional machining	**Lectures**	
Week15	**5**	**I, II, III, V and VI**	Final Exam	**Lectures**	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	NO	Weighting	GOs		
				I	II	VII
Assignment & Grading	**Class Activities**	**1**	**5%**		**3**	**2**
	Assignment	**3**	**3%**		**2**	**1**
	Quiz	**3**	**12%**	**12**		
	Project	**1**	**5%**	**5**		
	Lab	**1**	**20%**	**20**		
	Midterm exam	**1**	**15%**	**15**		
	Final exam	**1**	**40%**	**40**		
Total Marks			**100%**	**92**	**5**	**3**
GOs %				**100%**	**100%**	**100%**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Groover - Fundamentals of Modern Manufacturing- 5th 2013

Main references (sources)	• Manufacturing Processes 2nd ed - H. N. Gupta et al. (New Age, 2009)
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://ocw.mit.edu/courses/ -007-design-and- manufacturing-i-spring-2009

1. Course Name:
English language
2. Course Code:
UOMC101
3. Semester / Year:
2023−2024
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 3
7. Course administrator's name
Name: Dr. Mohammed Yaseen / Nada Bashar Abdulhadi Email: mohammed.alnuaimi@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. GO (IV). An ability to communicate effectively using oral, written, and graphic forms with different levels of audiences: This is the most directly related outcome. The English course aims to develop students' skills in reading, writing, listening, and speaking in English, which is crucial for effective communication in a global engineering context. The course's emphasis on forming basic sentences and using them in real-life situations helps students convey their ideas clearly and interact with a broader audience. 2. GO (V). An understanding of the responsibility of engineers to practice professionally and ethically at all times: While this outcome is more broadly related to professional conduct, the ability to communicate effectively and understand content in English can also contribute to ethical practice. For instance, understanding international standards, guidelines, and engineering literature in English can foster better adherence to global ethical norms. 3. GO (VI). An ability to acquire new engineering knowledge and skills in the mechatronics engineering fields: Proficiency in English is vital for engineers, as it allows them to access a vast array of engineering resources, research, and developments published in English. This enhances their capability to acquire new knowledge and stay updated with advancements in their field.

9. Teaching and Learning Strategies	
Strategy	• Theoretical lectures

	• Discussion sessions • Assignments • Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	IV/V/VI	Unit 1 / Hello	Theoretical lectures	
2	2	IV/V/VI	Unit 2 / Your world	Theoretical lectures	
3	2	IV/V/VI	Discussion	Discussion	Discussion
4	2	IV/V/VI	Unit 3 / All about you	Theoretical lectures	
5	2	IV/V/VI	Unit 4 / Family and friends	Theoretical lectures	
6	2	IV/V/VI	Unit 5 / The way I live	Theoretical lectures	Assignment
7	2	IV	Mid-term exam		Quiz
8	2	IV/V/VI	Unit 6 / Every day	Theoretical lectures	Assignment
9	2	IV/V/VI	Unit 7 / My favorites	Theoretical lectures	Quiz
10	2	IV/V/VI	Unit 8 / Where I live	Theoretical lectures	Discussion
11	2	IV/V/VI	Discussion	Discussion	Discussion
12	2	IV/V/VI	Unit 9 / Times past	Theoretical lectures	

13	2	IV/V/VI	Unit 10 / We had a great time!	Theoretical lectures	
14	2	IV/V/VI	General Review		
15		IV	Final Exam		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	NO	Weighting	GOs		
				IV	V	VI
Assignment & Grading	**Activities**	**3**	**10%**	**4**	**3**	**3**
	Assignment	**2**	**10%**	**5**	**2**	**3**
	Quiz	**2**	**10%**	**10**		
	Midterm exam	**1**	**10%**	**10**		
	Final exam	**1**	**60%**	**60**		
Total Marks			**100%**	**89**	**5**	**6**
GOs %				**100%**	**100%**	**100%**

12. Learning and Teaching Resources

Required textbooks (curricular books, any)	**New-headway- Beginner** **New-headway- Beginner workbook**
Main references (sources)	• Archived lectures by specialist teacher for every pape or video material
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Electrical circuit analysis
2. Course Code:
ECAN100
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
Name: Dr. Muhamad Azhar Abdilatef E-mail: Muhamad.azhar@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) Adequate knowledge in electrical system analysis methods and concepts. (**I, III, VI, VII**). 2) Ability to design and implement DC electrical circuits under realistic constraints and conditions. (**I,III, VI, VII**). 3) Ability to debug, verify, simulate, synthesize electrical circuits, (**I, III, VI, VII**). 4) Ability to devise, select, and use modern techniques and tools needed for electrical system design. (**I,III, VI, VII**).

9. Teaching and Learning Strategies	
Strategy	• Theoretical lectures • Laboratory experiments

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	I	Introduction, Basic Concepts	Theoretical lectures + Laboratory	Classwork Homework Quizzes
2	4	I	Units, Charge, Current, Voltage, Power, Conservation of Energy,		
3	4	I	Circuit Elements Resistive circuits Ohms' law,		

4	4	I, III	Kirchhoff's Voltage Law (KVL)		
5	4	I, III, VI, VII	Kirchhoff's Current Law (KCL)	Theoretical lectures + Laboratory	Classwork Homework Quizzes
6	4	I, III, VI, VII	The Single-Node-Pair Circuit		
7	4		Series Circuits, Parallel Circuits		
8	4		Single Loop/Node Circuits		
9	4	I, III, VI, VII	Resistor Combinations/Transformations	Theoretical lectures + Laboratory	Classwork Homework Quizzes
10	4		Mesh (Current) Analysis, Mesh Analysis with Super-meshes		
11	4		Equivalent Practical Sources, Star/Delta		
12	4	I, III, VI, VII	Circuits with Dependent Sources	Theoretical lectures + Laboratory	Classwork Homework Quizzes
13	4		Nodal Analysis		
14	4		Loop Analysis		
15	4		Superposition Theorem		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

Method	**Percentage %**
Classwork	10
Homework	10
Quizzes	15
Lab work	15

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Irwin, J.D. and R.M. Nelms, 2011. Basic Engineering Circuit Analysis, 11th Edition, Wiley.
Main references (sources)	• Dorf & Svoboda, Introduction to Electric Circuits (9th edition), John Wiley, 2013. ISBN1118477502, ISBN 9781118477502
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Strength of Materials
2. Course Code:
STMT150
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
Name: Islam Abdullah Aziz E-mail: islamabd@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Recognize various types of stress and strain, their components, and the function of each component[I, II,V]. 2. Be able to relate the effect of internal loads on a solid object to the strength of its material. [II, III]. 3. Recognize between different types of torsion [III,IV,V]. 4. Gain knowledge about the different type of stresses and deformations related to these loads [II, IV,V,VI]. 5. Identify the methods for drow shear and moment diagram [II,VI]. 6. Gain the ability to use the principles of this subject for the use of the formulas and rules of mechanical design cited in engineering codes[IV,V,VI]..

7. Teaching and Learning Strategies	
Strategy	• Theoretical lectures • Discussion sessions

8. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Stress: - Normal stress (tensile stress,	Theoretical Lectures and	-Home Work

2	2	Learn about methods for calculating stresses	compressive stress), shear stress, general state of stress, average normal stress in an axially loaded bar, average shear stress, allowable stress.	Discussion Sessions	-Quizzes
3	2				
4	2	Learn about methods for calculating strain	Strain: - Deformation, normal strain, shear strain, general state of strain		
5	2				
6	2				
7	2	Learn about the properties of Engineering Materials and methods for calculating them	Mechanical properties of materials: -The tension and compression test, Conventional stress-strain diagram, true stress-strain diagram, ductile materials, brittle materials, Hooke's law, Poisson's ratio, Shear stress-strain diagram, shear modulus of rigidity.		
8	2				
9	2	Studying the effect of axial forces and the stresses and strain resulting from them	Axial load: - Elastic deformation of an axially loaded member, superposition, Thermal stress.		
10	2	studying the types of torsion loads in Engineering Materials	Torsion: - Torsional deformation of a circular shaft, torsion formula, power transmission, angle of twist		
11	2				
12	2				
13	2	finding the values of moment and shear by drawing method	Bending: - Shear and moment diagrams, graphical method.		
14	2				
15	2				
9. Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.	
Method	**Percentage %**
Midterm Exam	20
Homework	10
Quizzes	10
Final exam	60

10.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Hibbeler, R. C. Mechanics of Materials, 8th Edition, Prentice Hall (2011).
Main references (sources)	• Ferdinand P. Beer, E Russell Johnston Jr., John T. DeWolf; Mechanics of Materials, Fourth edition, Mc Graw Hill. And any other mechanics of materials books can be used as reference books
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Engineering drawing
2. Course Code:
UOMC123
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 1
7. Course administrator's name
Name: zahraa reyad mahmood Email: zahraa.reyad@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Introducing students to engineering drawing. Follow the developments in the field of engineering drawing from the initial steps of the generation to the modern and future era time. **[I, III, VI]** 2. Students acquire the necessary skill to draw shapes manually To be able to clarify and design a specific form or idea for implementation **[I, III, VI]** 3. Use different methods to draw geometric shapes. **[I, III, VI]** 4. Explanation of the engineering drawing of the different geometric. **[I, III, VI]** 5. Developing the ability to visualize the student & the student's creative abilities to be able to read engineering maps **[I, III, VI]**

9. Teaching and Learning Strategies	
Strategy	Theoretical lectures 1- Discussion sessions 2- Assignments 3- Quizzes

10. Course Structure

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

1	3	**I**	Basic concepts of engineering drawing Types of lines used in engineering drawing Drawing board dimensions, drawing paper layout, and title writing Units used in engineering drawing How to find out the scale of the drawing How to enlarge a scale	Theoretical lectures	
2	3	**I**	Engineering Operations straight line bisection | Bisecting the angle | Draw straight line parallel to another line	Theoretical lectures	Discussion
3	3	**I**	Draw an arc tangent to two straight linesDraw an arc tangent to another arc and a straight line Draw an arc that touches t other arcs (the inner parenthesis, the outer parenthesis, and the comm parenthesis).	Theoretical lectures	Quizzes
4	3	**I**	How to draw a pentagon Draw the hexagon Draw an octagon dividing circle into eight equal par	Theoretical lectures	Quizzes
5	3	**I, III, VI**	Draw an inverted ogee curve	Theoretical lectures	Discussion
6	3	**I, III, VI**	Draw an ellipse using th four squares method Ellip + How to solve all engineering exercises with steps	Theoretical lectures	Quizzes
7	3	**I, III, VI**	**Mid-term Exam**	Theoretical lectures	**Mid-term Exam**
8	3	**I, III, VI**	**The concept of projections i engineering drawing and th method of deducing the thre projections from any solid sh**	Theoretical lectures	Discussion
9	3				
10	3				
11	3	**I, III, VI**	**Writing dimensions in engineering drawing**	Theoretical lectures	Quizzes
12	3	**I, III, VI**	**isometric drawing**		Quizzes

13	3			Theoretical lectures	
14	3				
15	3	**I, III, VI**	**Solve examples**	Theoretical lectures	Discussion
16	3	**I**	**Preparatory week before th final Exam**	Theoretical lectures	Discussion

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	NO	Weighting	GOs		
				I	II	VII
Assignment & Grading	**Activities**	**2**	**%8**		**9**	**5**
	Assignment	**3**	**%10**		**19**	**6**
	Quiz	**4**	**%12**	**10**		
	Midterm exam	**1**	**20%**	**10**		
	Final exam	**1**	**50%**	**50**		
Total Marks			**100%**	**70**	**19**	**11**
GOs %				**100%**	**100%**	**100%**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Computer skill**
Main references (sources)	• "NGINEERING DRAWING AND GRAPHIC TECHNOLOGY", Thirteen Edition, By: THOMAS E.FRENCH, CHARLES .VIERCK, ROBERT J.FOSTER • ENGINEERING DRAWING AND AUTO CAD", By:RAMZY SYHOOD HAMIED • TECHNICAL GRAPHICS COMMUNCATION", THIRD EDITION, Gary R
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:

AutoCAD

2. Course Code:

MEA125

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Present

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

3/1

7. Course administrator's name

Name: zahraa reyad mahmood
Email: zahraa.reyad@uomosul.edu.iq

8. Course Objectives

Course Objectives	**1)** Describing the principles of Auto CAD software (i). **2)** Describing the important tools in Auto CAD software (ii). **3)** Explaining the two dimensions drawings in Auto CAD software (iii). **4)** Training to draw the basic engineering geometry using Auto CAD software (iv). **5)** Learning the advance tools with doing excesses using Auto CAD software (v). **6)** Learning many excesses for engineering machines (vi).

9. Teaching and Learning Strategies

Strategy	1.Computer laboratories 2.Discussion sessions 3.Assignment 4.quizzes

10. Course Structure

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

1	3	I	Teaching the basics of Auto Basic settings, change the color, show the command ba the command line, and conv the line to a center line or a hiden line	Computer laboratories	
2	3	I	This lecture contains line an polyline drawing commands	Computer laboratories	
3	3	I	The circle of the circle is the arc of the arc and the drawin of the tangent, the inner arc and the outer arc	Computer laboratories	quiz
4	3	I	This lecture contains drawin commands Polygonal Ellips Rectangle (Pentagonal & Hexagonal & etc....)	Computer laboratories	quiz
5	3	I, II, VII	This lecture includes dimensions And how to mak it fit with the drawing and change the size and color This lecture includes on Hat commands	Computer laboratories	Assignment
6	3	I	This lecture includes Modify modification commands	Computer laboratories	Discussion
7	3	I, II, VII	Mid-term		Mid-term exa
8	3	I	This lecture includes the obj of snap	Computer laboratories	
9	3	I, II, VII			
10	3	I, II, VII	Solving engineering operati in AutoCAD	Computer laboratories	quiz
11	3	I, II, VII			quiz
12	3	I	Solve examples	Computer laboratories	Discussion
13	3	I	Solve examples	Computer laboratories	
14	3	I	This lecture includes Drawi projections in Autocad	Computer laboratories	
15	3	I	Final exam		Final exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	NO	Weighting	GOs

Assignment & Grading				**I**	**II**	**VII**	
	Lab work	**2**	**10%**		**9**	**5**	
	Assignment	**3**	**5%**		**10**	**6**	
	Quiz	**4**	**10%**	**10**			
	Midterm exam	**1**	**25%**	**10**			
	Final exam	**1**	**50%**	**50**			
Total Marks			**100%**	**70**	**19**	**11**	
GOs %				**100%**	**100%**	**100%**	

12. Learning and Teaching Resources

Required textbooks (curricular boo if any)	**Computer skill**.
Main references (sources)	• Dennis E. Maguire,"Engineering Drawing from First Principles Using AutoCAD", 1st Edition Butterworth..Heinemann, (Can be downloaded from the Course web page). • Kendrol Philips," AutoCAD Beginners Guide 2D and 3D Drawings", (Can be downloaded from the Course web page). • Lee Ambrosius and David Byrnes"AutoCAD AutoCAD LT All in One Desk Reference for Dummies", Wiley Publishing 2006, (Can be downloaded from the Course web page). • Dennis E. Maguire,"Engineering Drawing from First Principles Using AutoCAD", 1st Edition Butterworth..Heinemann, (Can be downloaded from the Course web page). • Kendrol Philips," AutoCAD Beginners Guide 2D and 3D Drawings", (Can be downloaded from the Course web page). • Lee Ambrosius and David Byrnes"AutoCAD AutoCAD LT All in One Desk Reference for Dummies", Wiley Publishing 2006, (Can be downloaded from the Course web page).
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Calculus II
2. Course Code:
ENGC122
3. Semester / Year:
2023−2024
4. Description Preparation Date:
30−3−2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
7. Course administrator's name
Name: RAGHAD RAIED MAHMOOD Email: Raghad.mahmood@uomosul.edu.iq

8. Course Objectives	
Course Objectives	• Understand the techniques of graphic function and finding the area and the volume generated by revolving the function about the any axis's, [I, II, IV, VII] • Gain knowledge about the techniques of differentiation and integration, [I, VI] • Gain an ability to apply the techniques of differentiation and integration to any type of physical problem, [I, VI] • Polar Coordinates, Graphing in Polar Coordinates[I, VI]

9. Teaching and Learning Strategies	
Strategy	Theoretical lectures Discussion sessions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week1	4	I, VI, VII	Techniques of Indefinite Integration; Definite Integrals; Properties of Definite Integrals	1+2	HW + Seminar + Midterm

Week2	4	I, VI	Solids of Revolution; Volume of Cylindrical Shell & Cross Section	1+2	HW + CW + midterm
Week3	4	I, VI	Solids of Revolution; Volume of Cylindrical Shell & Cross Section	1+2	HW + CW + midterm
Week4	4	I, VI	Arc Length; Surface of Revolution; Center of Mass	1+2	HW + CW + midterm
Week5	4	I, VI	Integration of Transcendental Functions	1+2	HW + CW + Seminar + midterm
Week6	4	I, VI	Indeterminate Forms and L' Hopital; Rule.	1+2	HW + CW + midterm
Week7	4	I, VI	Mid term exam	1+2	HW + CW + midterm
Week8	4	I, VI, VII	Basic Integration Formulas, Integration by Parts	1+2	HW + CW + midterm
Week9	4	I, VI	Trigonometric Integrals	1+2	HW + CW + midterm
Week10	4	I, VI,	Integrals of Rational Functions	1+2	HW + CW + midterm
Week11	4	I, VI	Integrals Partial Fractions	1+2	HW + CW + midterm
Week12	4	I, VI	Polar Coordinates	1+2	HW + CW + midterm
Week13	4	I, VI	Graphing in Polar Coordinates	1+2	HW + CW + midterm
Week14	4	I, VI	Graphing in Polar Coordinates	1+2	HW + CW + midterm
Week15	4	I, VI	Review	1+2	HW + CW + midterm

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	**No**	**Percentage %**		
			I	**VI**	**VII**
Assignment & Grading	Midterm exam	15	15	0	0
	Homework	12	6	2	4
	In-Class activity / Classwork	5	1	0	4
	Quizzes	3	3	0	0

	Lab work	0	0	0	0	
	Seminar	5	1	1	3	
	Final exam	60	60	0	0	
Sum		100	57	32	11	

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thomas' calculus In 13th, Also the library, there are many math's books that can be used as reference books.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Algorithm & Computer Programming
2. Course Code:
ALCP151
3. Semester / Year:
2023−2024
4. Description Preparation Date:
30−3−2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 3
7. Course administrator's name
Name: Raghad Raied Mahmood Email : Raghad.mahmood@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Advanced programming skills: students have a foundational understanding of programming, and learning C++ can enhance their skills and knowledge in advanced programming concepts, such as object- oriented programming and memory management. [I,II,III,VI,VII] 2. Preparation for advanced courses: C++ is a widely used programming language in many advanced computer science courses, such as algorithms, data structures, and operating systems. Learning C++ can provide university students with a strong foundation for success in these courses. [I,II,III,VI,VII] 3. Career opportunities: C++ is used in various industries, such as gaming, finance, and engineering, and learning C++ can provide university students with valuable skills that can lead to career opportunities. [I,II,III,VI,VII] 4. Understanding of computer science concepts: Learning C++ can help students understand fundamental concepts in computer science, such as algorithms, data structures, and memory management, which are critical to success in advanced courses and future careers. [I,II,III,VI,VII] 5.Improved problem-solving abilities: Programming requires a great deal of problem-solving and logical

	thinking, and learning C++ can help university students develop these skills, which are critical in various fields of computer science. [I,II,III,VI,VII]

9. Teaching and Learning Strategies

Strategy	• Theoretical lectures • Discussion sessions • Laboratory experiments • Computer laboratories • Projects • Industrial training

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	3	[I,II,III,VI,VII]	Algorithms & Flowcharts	2+1	HW + Seminar + Midterm
Week 2	3	[I,II,III,VI,VII]	BASIC DATA TYPES IN C++ And program structure	2+1	HW + CW + midterm
Week 3	3	[I,II,III,VI,VII]	Numbering System	2+1	HW + CW + midterm
Week 4	3	[I,II,III,VI,VII]	if-else statements	2+1	HW + CW + midterm
Week 5	3	[I,II,III,VI,VII]	for Looping (Repetition) Structure	2+1	HW + CW + Seminar + midterm
Week 6	3	[I,II,III,VI,VII]	CONTROL STRUCTURES II (REPETITION II)	2+1	HW + CW + midterm
Week 7	3	[I,II,III,VI,VII]	Exam 1	2+1	HW + CW + midterm
Week 8	3	[I,II,III,VI,VII]	Functions	2+1	HW + CW + midterm
Week 9	3	[I,II,III,VI,VII]	Recursive Functions	2+1	HW + CW + midterm
Week 10	3	[I,II,III,VI,VII]	Two- and Multidimensional Arrays	2+1	HW + CW + midterm
Week 11	3	[I,II,III,VI,VII]	Arrays as Parameters to Functions	2+1	HW + CW + midterm
Week 12	3	[I,II,III,VI,VII]	Records (structs)	2+1	HW + CW + midterm

Week 13	3	[I,II,III,VI,VII]	Tutorial	1+2	HW + CW + midterm
Week 14	3	[I,II,III,VI,VII]	Exam 2	2+1	HW + CW + midterm
Week 15	3	[I,II,III,VI,VII]	General Review	2+1	HW + CW + midterm

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method (Assessments)	**Marks**	**GOs**				
			I	**II**	**III**	**VI**	**VII**
Assignment & Grading	Midterm exam	20	15		5		
	Homework & Activities	7	2		2	2	1
	Mini project	7		3		2	2
	Quizzes	6	6				
	Lab work	10			6	2	2
	Final exam	50	40		10		
Sum		100	63	3	23	6	5
GOs			100%	100 %	100 %	100 %	100%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	C++ Programming From Problem Analysis to Program Design [5th Edition] book
Main references (sources)	• Archived lectures by specialist teacher for every paper or video material
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Physics
2. Course Code:
PHY102
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 2
7. Course administrator's name
Name: Dr.Mohammed Yaseen Email : mohammed.alnuaimi@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. **GO (I)** **Throughout the course, problem-solving will be a key focus. For example, in (Electrical Conduction in Metals), students will identify and solve problems related to electrical conductivity using their understanding of electron distribution and Fermi levels. Similarly, in (Diode Circuit Applications), they will evaluate and solve circuits, applying their knowledge of diodes. Assignments and lab work can be structured to require students to apply their knowledge of physics and mathematics to identify and solve real-world engineering problems, thus directly linking to this outcome.** 2. **GO (V)** **Integrate discussions on the ethical implications of electronics and its applications. For instance, while studying semiconductor materials, and photovoltaic cells, discuss the environmental impacts and ethical considerations of material sourcing and waste. Assign case studies or discussion topics that require students to consider the ethical dimensions of their work, emphasizing the responsibility of engineers to make decisions that are not only technically sound but also ethically responsible** 3. **GO (VI)**

	As the course progresses into more advanced topics like Advanced Semiconductor Concepts and Transistor Principles, students will be introduced to complex concepts that require them to integrate and extend their knowledge. Encourage self-directed learning, perhaps through a project or research assignment, where students delve into a topic not fully covered in class, demonstrating their ability to independently acquire new knowledge in the field 4. **GO (VII)** **Tutorials and group discussions: Implement team-based projects and labs throughout the course, such as in (Advanced p-n Junction Concepts) and (Application Circuits using Transistors), where students must work together to design, analyze, and troubleshoot circuits. These activities should require them to collaborate across different facets of the topic, analyze data, propose solutions, and meet project deadlines, mirroring the multi-disciplinary team dynamics found in professional environments.**

9. Teaching and Learning Strategies

Strategy	4- Theoretical lectures 5- Tutorial sessions 6- Assignments 7- Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	V / VI / VI	1. **Introduction to Atomic Structure and Energy Levels** ○ Overview of the atom and its models ○ Wave nature of light ○ Dual nature of matter	• Theoretica lectures • Tutorial sessions	

2	3	V / VI / VI	2. **Energy Band Theory and Crystal Structure** o Energy-band theory of metals, insulators, and semiconductors o Crystal structure and bonding (ionic, covalent, and metallic)	• Theoretical lectures • Tutorial sessions	
3	3	V / VI / VI	3. **Detailed Look at Crystal Structures** o Internal structure of material cells o Packing, Miller indices o Crystal planes and directions	• Theoretical lectures • Tutorial sessions	
4	3	V / VI / VI	4. **Electrical Conduction in Metals** o Mobility and conductivity o Energy distribution of electrons o Fermi levels and work function	• Theoretical lectures • Tutorial sessions	**Activity**
5	3	I / V / VI / VII	5. **Electronic Emission in Metals** o Electronic emission theories	• Theoretical lectures • Tutorial sessions	**Quiz**

			○ Factors affecting electronic emission		
6	3	I / V / VI / VII	6. **Introduction to Semiconductors** ○ Semiconductor materials (Si, Ge, and compound semiconductors) ○ Intrinsic and extrinsic semiconductors	• Theoretical lectures • Tutorial sessions	**Assignment**
7		I	**Mid-term exam**		**Midterm Exam**
8	3	V / VI / VI	7. **Advanced Semiconductor Concepts** ○ Fermi-level in semiconductors ○ Diffusion and carrier lifetime ○ Hall effect	• Theoretical lectures • Tutorial sessions	
9	3	I / V / VI / VII	8. **p-n Junction Theory** ○ p-n junction in equilibrium ○ Current-voltage characteristics ○ Charge-control description of a diode	• Theoretical lectures • Tutorial sessions	**Assignment**
10	3	V / VI / VI	9. **Advanced p-n Junction Concepts** ○ Transition and diffusion	• Theoretical lectures • Tutorial sessions	**Activity**

			capacitances o Diode switching times o Diode models and small-signal model		
11	3	V / VI / VI	10. **Diode Circuit Applications** - Rectifiers - Zener diodes voltage regulators - Clipping and clamping circuits	• Theoretica lectures • Tutorial sessions	**Activity**
12	3	I / V / VI / VII	11. **Waveform Generation and Load Line Concept** o Waveform generation using diodes o Load line concept o Introduction to Hetero-junctions and double Hetero-junctions	• Theoretica lectures • Tutorial sessions	**Quiz**
13	3	V / VI / VI	13. **Transistors - Principles and Operations** o Principle of operation and types of transistors o Transistor biasing circuits	• Theoretica lectures • Tutorial sessions	
14	3		Review of the course material		
15		I	Final Exam		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	NO	Weighting	GOs			
				I	V	VI	VII
Assignment & Grading	Activities	3	10%		3	3	4
	Assignment	2	10%	4	3	3	
	Quiz	2	10%	10			
	Midterm exam	1	10%	10			
	Final exam	1	60%	60			
Total Marks			100%	84	6	6	4
GOs %				100%	100%	100%	

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	○ Dr. Mudafar A. Alnimahl. (**20**01) "ELECTRONIC PHYSIC ", 1st Edition, ISBN: 978-1-118-12984-5, USA.
Main references (sources)	○ Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. ○ Semiconductor Devices Physics and Technology. S. M. SZE; M. K. LEE by John Wiley & Sons, Inc Third Edition 2012
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Calculus I
2. Course Code:
UOMC121
3. Semester / Year:
Fall / 2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Laith Mohammad Jasim E-mail: jasiml68@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) The successful Calculus I student should be able to apply the following competencies to a wide variety of functions, including piecewise, polynomial, rational, algebraic, trigonometric, inverse trigonometric, exponential, and logarithmic. 2) Determine the existence of, estimate numerically and graphically, and find algebraically the limits of functions. 3) Determine continuity at a point or on intervals and distinguish between the types of discontinuities at a point. 4) Determine the derivative of a function using the limit definition. Interpret the derivative as the slope of a tangent line to a graph, the slope of a graph at a point, and the rate of change of a dependent variable with respect to an independent variable. 5) Determine the derivative and higher derivatives of a function explicitly using differentiation formulas. And determine derivatives implicitly. 6) Solve related rate problems. And determine absolute extrema for a continuous function on a closed interval. Use these and other appropriate techniques to solve optimization problems. 7) For a given set of matrices, determine addition and multiplication using the rules. 8) Determine the transpose, determinant, and Inverse of a matrix. 9) Using Cramer's, Inverse, and Gauss elimination methods to solve the system of linear algebraic equations

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions

10. Course Structure

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

1	**4**	**I, VI**	Prerequisites for Calculus :Coordinates and Graphs in the Plane; Directions and Quadrants; Distance between Points; Graphs of Equations; Intercepts and More about Graphing; Slope and Equations for Lines; Slope of Non-vertical Lines; Lines That are Paralle	1 + 2	HW + CW
2	**4**	**I, VI**	Functions and Their Graphs: Domains and Ranges are Often Intervals; Even Functions and Odd Functions; Functions Defined in Pieces; How to Shift a Graph; Equations for Circles in the Plane; Equations for Parabolas.	1 + 2	HW + CW
3	**4**	**I, VI**	A Review of Trigonometric Functions: Radian Measure; The Six Basic Trigonometric Functions; Calculating Sines 4and Cosines; Graphs of Trigonometric Functions.	1 + 2	HW + CW
4	**4**	**I, VI**	Limits and Continuity: The Limit of a Function; The functions that haven't limits; The theories (1, 2, 3 to 6) of limit; Eliminating Common Factors from Zero Denominators; The Sandwich Theorem; sin (theta)theta theorem; Limits Involving Infinity; Asymptot	1 + 2	HW + CW
5	**4**	**I, VI**	Continuous Functions; Continuity at a Point; Continuity Test; Properties of Continuous Functions; Inverse Functions and Continuity; composites of continuous functions; Limits of Continuous Functions.	1 + 2	HW + CW
6	**4**	**I, VI**	Derivatives: mathematical definition of the derivative; Tangents and the Derivative at a Point; ; Defining Slopes and Tangent Lines; The Derivative of a function; The Slope of Lines; Differentiation Rules; Integer Powers, Multiples, Sums, and Differences;	1 + 2	HW + CW
7	**4**	**I, VI**	Velocity, Speed, and Other Rate of Change such as acceleration and jerk; Derivatives of Trigonometric Functions such as Sine, Cosine and other Basic Functions; The Chain Rule; Integer Powers of Differentiable Functions; Derivative Formulas that Include th	1 + 2	HW + CW
8	**4**	**I, VI**	Implicit Differentiation and Fractional Powers; Lenses, Tangents, and Normal Lines; Using Implicit Differentiation to Find Derivatives of Higher Order; Fractional Powers of Differentiable Functions; Linear Approximations and Differentials.	1 + 2	HW + CW
9	**4**	**I, VI**	Applications of Derivatives: Related Rates of Change; Maxima, Minima, and the Mean Value Theorem; The First Derivative Theorem; The Mean Value Theorem; Curve Sketching with y’ and y“; Points of Inflection; Graphing with y’ and y“.	1 + 2	HW + CW
10	**4**	**I, VI**	Graphing Rational Functions Asymptotes and Dominant Terms: Horizontal and Vertical Asymptotes; Oblique Asymptotes; Optimization; Applied Examples from Mathematics; Applied Examples from Industry.	1 + 2	HW + CW
11	**4**	**I, VI**	Mid Exam : Matrices: Basic Definitions; Addition, Subtraction and Multiplication	1 + 2	HW + CW
12	**4**	**I, VI**	Transposition, Determinants and Inverse of a Matrix; System of Linear Algebraic Equation.	1 + 2	HW + CW
13	**4**	**I, VI**	Gramer’s rule and Matrix inverse.	1 + 2	HW + CW
14	**4**	**I, VI**	Gauss elimination and Gauss-Jordan method.	1 + 2	HW + CW
15	**4**	**I, VI**	Final Exam.	1 + 2	HW + CW

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	No	Percentage %	
			I	VI
Assignment & Grading	Midterm exam	20	20	0
	Homework	8	6	2
	In-Class activity / Classwork	5	5	0
	Quizzes	7	5	2
	Lab work	0	0	0
	Final exam	60	60	0
Sum		100	96	4

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	George B. Thomas, Jr., Calculus, Thirteenth Edition, Pearson Education, Inc. , 2014.
Main references (sources)	Richard Courant and Fritz John, Introduction to Calculus and Analysis, Vol. 1, Springer, 1999.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description / Second level

1. Course Name:
Digital Logic
2. Course Code:
DILO225
3. Semester / Year:
2024
4. Description Preparation Date:
3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
2/2
7. Course administrator's name
Name: Dr. Muhamad Azhar Abdilatef Email : muhamad.azhar@uomosul.edu.iq
8. Course Objectives

Course Objectives	**1)** Adequate knowledge in digital system design concepts (**I, II, III, VI**). **2)** Ability to design and implement digital circuits under realistic constraints and conditions (**I, II, III, IV,VI**). **3)** Ability to debug, verify, simulate, synthesize digital circuits (**I, II, III, VI, VII**). **4)** Ability to devise, select, and use modern techniques and tools needed for digital system design (**I, II,III, VII**).

○ Teaching and Learning Strategies

Strategy	• Theoretical lectures • Discussion sessions • Laboratory experiments • Computer laboratories

9. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I**	Numerical System o Binary System o Octal System o Hexadecimal System	Theoretical lectures	HW
2	2	**I**	Numerical System Converting between Systems (Binary, Octal, Hexadecimal, Decimal) o Mathematical Operations o Binary System Problems	Theoretical lectures	EXAM
3	2	**I**	Logic Gates o Gates with their symbols and truth tables o Logical Operations o Timing Diagram for logic gates o Logic gates as switches	Theoretical lectures	HW
4	2	**II**	Logic Circuit Design o Logic circuit designing steps o Implementation of Logic circuits using truth tables o Implementation of logic circuits using equations o Converting logic circuit to logic equations	Theoretical lectures	EXAM
5	2	**III, IV**	Boolean Algebra and Identities o Basic Identification of Boolean algebra o Duals of Expressions o Demorgan's Theories	Theoretical lectures/ Discussion sessions	CW

			o Truth tables for Demorgan		
6	2	**I, II**	Boolean Algebra and Identities Algebraic Manipulation o Simplifying Functions o Fewer Gates o Duality Properties o Complement of Functions	Theoretical lectures	Exam
7	2	**I**	Strategies of Minimizations o Terminology and Definitions o Guidelines of Simplifying Functions	Theoretical lectures	HW
8	2	**II**	K-Map Simplifying SOP Procedures □ Three Variable K-Map □ Four Variable K-Map □ Five Variable K-Map o Karnaugh Map POS Minimization □ Three Variable K-Map □ Four Variable K-Map □ Five Variable K-Map o Getting between SOP and POS o Don't Care Conditions	Theoretical lectures/ Discussion sessions	CW
9	2	**III, VII**	Multiplexer o Definitions o Constructions o 2-1-multiplexer o 4-1-multiplexer 8-1-multiplexer o 16-1-multiplexer o 32-1-multiplexer o Realizing Logic Functions Efficiently	Theoretical lectures	HW

			o Larger Multiplexer o Cascading Multiplexer Circuits		
10	2	**I, IV**	De-Multiplexer o Definitions o Applications o 1-4-demultiplexer o 1-8-demultiplexer o 1-16-demultiplexer o Timing Diagram o 1-m-demultiplexer o De-multiplexer as Decoder o Characteristics table of De-multiplexer	Theoretical lectures	EXAM
11	2	**I, II**	Decoder o Characteristics of Decoder o Construction of Decoder o Types of Decoders o 2-4-decoder o 3-8-decoder o 4-16 –decoder o Applications of Decoder o Expansions of Decoder	Theoretical lectures	HW
12	2	**I, VI**	Encoder o Definitions o Types o Applications o Code Convertor o Binary to Gray Code Convertor	Theoretical lectures	CW
13	2	**II**	Adders and Subtractors Circuits o Half Adder o Full Adder o Binary Adder o Binary Subtractor o Binary Adder Subtractor	Theoretical lectures	EXAM

14	2	**VII, V**	Sequential Logic Circuits o Latches and Some Definitions o Synchronous and Asynchronous Sequential Circuits o SR-Latches o SR-Latches as Memories D-Latches	**VII, V**	HW
15	2	**I, II, VI**	Sequential Logic Circuits o JK-latches o T-Laches Counters	**I, II, VI**	CW

10. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	التفاصيل			العدد	النسبة المئوية%
Assignments & Grading	**Midterm exam**			20	20%
	Assignments (Homework) + project (if any)			5	5%
	Quizzes			5	5%
	Activities			5	5%
	Lab work			15	15%
	Final Exam	**Theoretical Part:** 40	**Practical Lab Part:** 10	50	50%

o Learning and Teaching Resources

Required textbooks (curricular books, if any)	Digital Logic and Computer Design by M Morris Mano
Main references (sources)	• Digital Logic Design by Pu-Jen Cheng, Digital Logic Design by Nasser M. Sabah
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Thermodynamic and heat transfer

2. Course Code:

THHT203

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Presence

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

2 / 2

7. Course administrator's name

Name: Loay Bashir
E-mail: loayaldabbagh@uomosul.edu.iq

8. Course Objectives

Course Objectives	1) Understand properties of real substances, such as steam and ideal gases [I, II] 2) Learn how to use tabular data and equations of state [I, II] 3) Understand and use the process diagrams. [I, II] 4) Understand closed systems and control volumes. [I, II, VI] 5) Understand the first law and its basic applications. [I, II] 6) Understand the second law and its basic applications. [I, II, VI]

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Computer laboratories 5-Projects 6-Industrial training

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	I, II	Introduction to Thermodynamics		

2	**2**	I, II	Properties of Pure Substances	Lecturer	
3	**2**	I, II	The First Law of Thermodynamics for Closed Systems		
4	**2**		The First Law of Thermodynamics for Closed Systems		
5	**2**		The First Law of Thermodynamics for Closed Systems		
6	**2**	I, II	The First Law of Thermodynamics for Open Systems		Midterm exam
7	**2**	I, II, VI	The First Law of Thermodynamics for Open Systems		
8	**2**		Mid-Term Examination		
9	**2**		The Second Law of Thermodynamics		
10	**2**	I, II	The Second Law of Thermodynamics		
11	**2**	I, II	Introduction to heat transfer		Quizzes
12	**2**	I, II	Introduction to heat transfer		
13	**2**	I, II	One dimensional conduction		
14	**2**	I, II	One dimensional conduction		
15	**2**	I, II, VI	Final Examination		Final exam

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method (Assessments)	No.	Marks	GOs		
				I	II	VI
Assignment & Grading	Midterm exam	1	15	12	3	
	project	1	6		4	2
	Class Activity	4	4	2	2	
	Quizzes	5	15	15		
	Final exam	1	60	60		
Total Mark			100	89	9	2
GOs %				100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Çengel, Y. A. and Boles, M. A., Thermodynamics: an Engineering Approach, 6th ed., The McGraw-Hill Companies, New York, © 2008.
Main references (sources)	Bergman, lavine, Incropera and dewitt - Fundamentals of Heat and Mass Transfer, John Wiley & Sons, Inc., 7th Edition 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
English Language Pre - Intermediate
2. Course Code:
3. Semester / Year:
2022 - 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
1 / 1
7. Course administrator's name
1- Name: Dr. Mohammed Falah Mohammed Kanna E-mail: mohammed.falah_kanna@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to: **1. Knowledge (Link to GO I)** Develop the ability to effectively comprehend and communicate information from medium-length books and general interest articles, while identifying and understanding new vocabulary in context. Enhance narrative writing skills to produce coherent accounts of past experiences or events in up to three paragraphs, utilizing appropriate past tense structures. Furthermore, master various grammar structures, including present, past, future, and present perfect tenses. Assessment of these competencies will be conducted through the midterm exam, quizzes, assignments, and final exam. **2. Skills (Link to GO: IV)** Develop the ability to communicate effectively through oral, written, and graphic forms of English, catering to diverse audiences at varying proficiency levels. This competency will be assessed through the Assignment. **3. Skills (Link to GO: VII)** Function effectively on multi-disciplinary teams to analyze data, make writing plans, and meet deadlines within the context of the English language. This competency will be assessed through the group work of Assignment.

9. Teaching and Learning Strategies	
Strategy	1. Theoretical lectures 2. Exam and Quizzes 3. Assignments

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**1**	**I**	Chapter one (tenses) Getting to know you	Lecture	
2	**1**	**I**	Chapter one (tenses) Getting to know you	Lecture	
3	**1**	**I, IV, VII**	Chapter two (Present tenses) Whatever makes you happy	Lecture	**Assignment**
4	**1**	**I**	Chapter two (Present tenses) Whatever makes you happy	Lecture	
5	**1**	**I**	Chapter three (Past tenses) What's in the news?	Lecture	**Quiz**
6	**1**	**I**	Chapter three (Past tenses) What's in the news?	Lecture	
7	**1**	**I**	Chapter four (Quantity) Eat, drink,	Lecture	
8		**I**	**Midterm Exam**		Midterm Exam
9	**1**	**I**	Chapter five (Verb pattern, Future form) Looking forward	Lecture	
10	**1**	**I**	Chapter five (Verb pattern, Future form) Looking forward	Lecture	**Quiz**
11	**1**	**I**	Chapter six (Comparitive and Superlative Adjectives) The way I see it	Lecture	
12	**1**	**I, IV, VII**	Chapter six (Comparitive and Superlative Adjectives) The way I see it	Lecture	**Assignment**
13	**1**	**I**	Chapter seven (Present Perfect) Living history	Lecture	
14	**1**	**I**	Academic Writing	Lecture	
15	**1**	**I**	Review		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method (Assessments)	No.	Weightings	GOs		
				I	IV	VII
Assignment & Grading	Midterm exam	1	20%	20		
	Assignment	2	10%	2	5	3
	Quizzes	2	10%	10		
	Final exam		60%	60		
Sum			100%	92	5	3
GOs %				100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• New Headway -Pre-Intermediate/ Student's Book • New Headway -Pre-Intermediate/ Workbook
Main references (sources)	• Archived lectures by specialist teacher for every paper or video material
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Engineering Mechanics II (Dynamic)

2. Course Code:

EMDY201

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Presence

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

2 / 2

7. Course administrator's name

Name: Dr. Omar Waleed Maaroof
E-mail: omarmaaroof@uomosul.edu.iq

8. Course Objectives

Course Objectives	After completion of the course the student should be able to: 1. Describe and calculate the motion (position, velocity, acceleration) for particles and solids in plane motion. [I, VII] 2. Apply free-body diagrams and solve Newton's second law for plane problems. [I, VII] 3. Describe and explain kinetic energy, potential energy and work. Solve problems in the design of dynamical systems using these concepts. [I, II, VI] 4. Apply linear and angular momentum for particles and solids in plane motion. [I, II, VI, VII] 5. Explain and calculate the moment of inertia for simple solids. [I, II, VII]

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I, II, VI, VII	Ch.1 Introduction to Dynamics	Theoretical lectures	Written test assignment

				Discussion sessions	
2	2	I, II, VI, VII	Ch.2 Kinematics of Particles, Rectilinear Motion	Theoretical lectures Discussion sessions	Written test
3	2	I, II, VI, VII	Plane Curvilinear Motion, Rectangular Coordinates (x-y)	Theoretical lectures Discussion sessions	assignment
4	2	I, II, VI, VII	Normal and Tangential Coordinates (n-t)	Theoretical lectures Discussion sessions	Written test
5	2	I, II, VI, VII	Polar Coordinates (r-Theta)	Theoretical lectures Discussion sessions	assignment
6	2	I, II, VI, VII	Relative Motion (Translating axes)	Theoretical lectures Discussion sessions	Written test
7	2	I, II, VI, VII	Ch.3 Plane Kinetics of Particles	Theoretical lectures Discussion sessions	assignment
8	2	I, II, VI, VII	Direct Application of Newton's second Law (Force, Mass, and Acceleration): Rectilinear and Curvilinear Motion	Theoretical lectures Discussion sessions	Written test assignment
9	2	I, II, VI, VII	Work and Kinetic Energy	Theoretical lectures Discussion sessions	Written test assignment
10	2	I, II, VI, VII	Impulse and Momentum (Linear)	Theoretical lectures Discussion sessions	Written test assignment
11	2	I, II, VI, VII	Mid Term Examination		Written test

12	2	I, II, VI, VII	Ch.5 Plane Kinetics of Rigid Bodies: Rotation	Theoretical lectures Discussion sessions	assignment
13	2	I, II, VI, VII	Relative Velocity	Theoretical lectures Discussion sessions	Written test
14	2	I, II, VI, VII	Ch.6 Plane Kinetics of Rigid Bodies: direct application of Newton's second Law: Translation	Theoretical lectures Discussion sessions	assignment
15	2	I, II, VI, VII	Appendix B. Mass Moment of Inertia	Theoretical lectures Discussion sessions	Written test

11.

	Method	No
Assignment & Grading	Midterm exam	20
	Homework + project (if any)	10
	Quizzes	10
	Lab work	0
	Final exam	60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering Mechanics "Dynamics", J.L. Meriam and L.D. Kraige 5th ed
Main references (sources)	Engineering Mechanics 'Dynamics", R. C. Hibbeler
Recommended books and references (scientific journals, reports...)	Engineering Mechanics Dynamics, Andrew Pyel and Jan Kiwsalaas
Electronic References, Websites	

1. Course Name:
electrical machine
2. Course Code:
ELMA202
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Myasar salim alattar E-mail: myasaralattar@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to: 1. **Ability to solve engineering problems.** 2. **Ability to produce engineering designs.** 3. **Ability to create and carry out measurements and tests.** 4. **Ability to work on teams and manage projects**

9. Teaching and Learning Strategies

Strategy	1- Theoretical lectures 2- home work 3- Assignments 4- lab

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	types of electric machine (shunt, series , compound	Theoretical lectures	

2	2	I,II	construction of dc machine	Theoretical lectures	
3	2	I,II	principle operation of dc motor torque and voltage equatic of dc motor	Theoretical lectures	
4	2	I,II	dc shunt motor equivalent circuit , analysi	Theoretical lectures	
5	2	I, II, III	dc series motor equivalent circuit , analysi	Theoretical lectures	quiz
6	2	I,II	dc compound motor equivale circuit , analysi	Theoretical lectures	
7	2	I, II, ,III,VII	losses in dc motor and efficiency	Theoretical lectures	
8	2	I,II,III	امتحان نصف الفصل	Theoretical lectures	mid term exam
9	2	I,II	speed control method of dc shunt motor (flux control	Theoretical lectures	
10	2	I, II, ,III,VII	speed control method of dc shunt motor (armature control, voltage control)	Theoretical lectures	
11	2	I, II, III	speed control method of dc series motor (flux control	Theoretical lectures	quiz
12	2	I,II	speed control method of dc series motor voltage control	Theoretical lectures	

13	2	**I,II**	characteristics of dc shunt motor	Theoretical lectures	
14	2	**I,II**	characteristics of dc compound motor	Theoretical lectures	
15	2	**I, II, III**			**Final Exam**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**NO**	**Weighting**	**GOs**			
				I	**II**	**III**	**VII**
Assignment & Grading	**Activities**		**5%**				
	Assignment	**3**	**5%**		**5**		
	Quiz	**2**	**5%**	**5**			
	Midterm exam	**1**	**25%**	**25**			
	LAB	**3**	**25%**	**5**	**5**	**10**	**5**
	Final exam	**3**	**40%**	**40**			
Total Marks			**100%**	**75**	**10**	**10**	**5**
GOs %				**100%**	**100%**	**100%**	

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Electrical Machines by S. K. Sahdev 2018 • PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS , THIRD EDITION .by P. C. SEN 2013
Main references (sources)	• ELECTRICAL MACHINES with MATLAB® ,Second Edition by TURAN GÖNEN ,2012
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

ELECTROMECHANICAL SYSTEM

2. Course Code:

ELES253

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Presence

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

4 / 3

7. Course administrator's name

1- Name:Dr.Myasar salim altar

E-mail: myasaralattar@uomosul.edu.iq

8. Course Objectives

Course Objectives	The objective of this course is to: 1. **Ability to solve engineering problems.** 2. **Ability to produce engineering designs.** 3. **Ability to create and carry out measurements and tests.** 4. **Ability to work on teams and manage projects.**

9. Teaching and Learning Strategies

Strategy	1- Theoretical lectures 2- home work 3- Assignments 4- computer lab

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	introduction to electromechanical energy conversion theory , principle, limmitation , application	Theoretical lectures	

2	2	I,II	solenoid , types , construction	Theoretical lectures	
3	2	I,II	solenoid , principle operation , application	Theoretical lectures	
4	2	I,II	brushless dc motor , construction , operation	Theoretical lectures	
5	2	I, II, III	brushless dc motor speed control	Theoretical lectures	quiz
6	2	I,II	servo motor construction , operation , speed control,	Theoretical lectures	
7	2	I, II, ,III,VII	servo motor control circuit	Theoretical lectures	
8	2	I,II,III	mid term exam	Theoretical lectures	mid term exam
9	2	I,II	stepper motor construction , operation , speed control,	Theoretical lectures	
10	2	I, II, ,III,VII	stepper motor control circuit	Theoretical lectures	
11	2	I, II, III	single phase induction motor , construction , type	Theoretical lectures	quiz
12	2	I,II	single phase induction motor starting methode seperate type , shaded pole	Theoretical lectures	
13	2	I,II	universal motor construction , operation	Theoretical lectures	
14	2	I,II	universal motor speed control,	Theoretical lectures	
15	2	I, II, III			**Final Exam**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs

				I	II	III	VII
Assignment & Grading	**Activities**		**5%**				
	Assignment	**3**	**5%**		**5**		
	Quiz	**2**	**5%**	**5**			
	Midterm exam	**1**	**25%**	**25**			
	LAB	**3**	**25%**	**5**	**5**	**10**	**5**
	Final exam	**3**	**40%**	**40**			
Total Marks			**100%**	**75**	**10**	**10**	**5**
GOs %				**100%**	**100%**	**100%**	

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Electrical Machines by S. K. Sahdev 2018 • PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS , THIRD EDITION .by P. C. SEN 2013
Main references (sources)	• ELECTRICAL MACHINES with MATLAB® ,Second Edition by TURAN GÖNEN ,2012
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:	
Signals and Systems	
2. Course Code:	
SISY254	
3. Semester / Year:	
2024 – 2023	
4. Description Preparation Date:	
30/3/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 / 2	
7. Course administrator's name	
1- Name: Dr. Zahraa Tarik Mohammad A. E-mail: zahraata.eng@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The objective of this course is to: • Classify signals according to a variety of criteria including continuous, discrete, periodic, aperiodic, even, odd, power, and energy, and represent both signals and systems in multiple forms. **(Link to GO I)** • Perfom different operation on signals including shifting and scaling used in different application, Understand and analyze systems interconnection and block diagrams to be able to modify or build systems. **(Link to GO I, II, IV)** • Understand the basics of sampling therorem, and the Nyquist theorem and study their effects, display aliasing problem and solution, as well as quantization, coding and their application in real world. **(Link to GO I, II, VI)** • Know and indentify the types of discrete time signals types in terms of graphical, functional, tabular, and sequential (vector), as well as perform signal manpulation, including amplitude scaling, amplitude shfting, sum of two signals, and product of two signals. **(Link to GO I, II, IV)** • Define, state and identify system properties of linearity, time (in)variance, causality, memory and stability. **(Link to GO I, II)** • Perform the basic operations and characterization on Linear Time In-variant systems including convolution, de-convolution, and correlation, and understand modern digital signal processing and its advantages, disadvantages, and application **(Link to GO I, II, IV,VI)** • Describe the concept and techniques for performing signal modulation and analyse the performance of Amplitude Modulation (AM), Phase

	Modulation (PM), and Frequency Modulation (FM). **(Link to GO I, II, IV,VI)**

9. Teaching and Learning Strategies

Strategy	1. Theoretical lectures 2. Discussion sessions (Activities) 3. Tutorial sheets 4. Exam and Quizzes 5. Assignments

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I, VI**	Introduction, the basic definition of signals and their main types with examples (continuous and discrete-time signals)	Lecture	**Assignment**
2	2	**I, VI**	Introduction to systems and their types and application examples	Lecture	**Assignment**
3	2	**I**	Classification of signals: (continuous-discrete), (analog-digital), (periodic – aperiodic), and (causal– noncausal)	Lecture	**Assignment**
4	2	**I**	Classification of signals: (even – odd), (power – energy), (deterministic – random), and (finite - infinite length)	Lecture	**Activity**
5	2	**I, II**	Signal operation: shifting, scaling (time and value), inversion (time and value), and combined operation. Signal useful function: unit step (continuous and discrete), ramp, unit impulse (with properties), triangular and complex exponential (continuous and discrete)	Lecture	**Tutorial sheet**
6	2	**I, II, IV**	Signal expression and representation: graphical	Lecture	**Quiz**

			form, functional form, and equation form + Signals construction		
7		**I, II**	**Mid-term Exam**	Lecture	**Midterm Exam**
8	2	**I, II, VI**	Sampling theorem: Nyquist low and aliasing problem with solution		**Activity**
9	2	**I, II, VI**	Introduction to Quantization and Coding	Lecture	**Tutorial sheet**
10	2	**I, II, IV**	Discrete-time signal representation types: graphical, functional, tabular, and sequential (vector), Elementary discrete time signal with classification and manipulation	Lecture	**Activity**
11	2	**I, II, IV**	Description and classification of the system with interconnection & block representation)	Lecture	**Quiz**
12	2	**I, VI**	Introduction to the linear time-invariant system (LTIS) with conditions and System properties (linearity, time-invariant, causality, stability, and memory)	Lecture	**Tutorial sheet**
13	2	**I, II, IV, VI**	Convolution operation and methods: graphical, table look-up, vector by a matrix, add overlap, and analytical method with image (matrix) convolution.	Lecture	**Activity**
14	2	**I, II, IV, VI**	Deconvolution method: iterative, polynomial, and graphical method, Correlation types and application: quantitative correlation, cross-correlation, and auto-correlation	Lecture	**Quiz**
15	2	**I, II, IV, VI**	Modulation: reason, classification, and types (amplitude, frequency, phase, and spread spectrum), Modern digital		**Activity**

			signal processing advantages, disadvantages, and applications		
16	3	**I, II**	**Final Exam**		**Final exam**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method (Assessments)	**No.**	**Weightings**	**GOs**			
				I	**II**	**III**	**VII**
Assignment & Grading	Midterm exam	1	15%	10	5		
	Assignment	2	10%	2	3	2	3
	Activity	3	5%			3	2
	Quizzes	2	10%	8	2		
	Final exam		60%	55	5		
Sum			100%	75	15	5	5
GOs %				100%	100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Simon Haykin and Barry Van Veen, "Signals and systems", Wiley 2005 • Oppenheim, Willsky, & Young, "Signals and Systems", Prentice-Hall, 1996
Recommended books and references (scientific journals, reports...)	• Benoit Boulet, "Fundamentals of signals and systems", Charles River Media 2006 • James H., Ronald W., Mark A. “Signal Processing First”, Pearson Education, Inc, Pearson Prentice Hall 2003
Electronic References, Websites	

1. Course Name:
Engineering Economics
2. Course Code:
ENGC226
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2/ 2
7. Course administrator's name
Name: Ali Ayad Abduljabbar E-mail: alibabeli@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. One of the most important factors for the success of the application of value engineering is linking the cost value to the actual needs of users and how to translate this into designs to avoid unnecessary cost and work to eliminate it, which raises the value of engineering projects.**[I]** 2. Taking a model for an engineering project to study the effect of the design on costs by providing quantities of raw materials and the percentage of waste if the waste is taken into account by the designer and the impact of this on the cost of the project.**[I]** 3. Practicing the inductive approach during the stage of the theoretical study with the aim of presenting the value management approach, its concepts, definitions and concepts of costs and their relationship to the various stages of the project. **[II]** 4. Moving from the stage of the applied study to the analytical method in order to link the stage of applying the value management approach to the design stage and its impact on cost. **[VII]**

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3- Assignments

	4- Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I**	Engineering economy (definition and concept)	Theoretical lectures	
2	2	**I, II, VII**	Interest and economic relationship	Theoretical lectures	**Activity**
3	2	**I**	Capital time value, cash flow	Theoretical lectures	**Quiz**
4	2	**I, II, VII**	Comparison between alternatives	Theoretical lectures	**Assignment**
5	2	**I**	Present value concept, equivalent annual cost	Theoretical lectures	**Quiz**
6	2	**I, II, VII**	Economic Appraisal, Discount Rate		**Assignment**
7	2		Midterm exam	Theoretical lectures	
8	2	**I**	Payback period, internal rate of return	Theoretical lectures	**Quiz**
9	2	**I**	Replacement	Theoretical lectures	**Activity**
10	2	**I, II, VII**	depreciation	Theoretical lectures	**Assignment**
11	2	**I**	Inflation	Theoretical lectures	
12	2	**I, II, VII**	Breakeven point	Theoretical lectures	**Assignment**

13	2	**I**	Sensitivity analysis	Theoretical lectures	**Quiz**
14	2	**I**	Feasibility study	Theoretical lectures	
15	3		Final exam		

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**NO**	**Weighting**	**GOs**		
				I	**II**	**VII**
Assignment & Grading	**Activities**	**2**	**5%**	**1**	**2**	**2**
	Assignment	**4**	**5%**	**1**	**2**	**2**
	Quiz	**4**	**5%**	**1**		
	Midterm exam	**1**	**25%**	**25**		
	Final exam	**1**	**60%**	**60**		
Total Marks			**100%**	**92**	**4**	**4**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Anthony Esposito, Fluid Power with Applications, 7th ed., 2014.
Main references (sources)	Festo Didactics , various level textbooks, and workbooks
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Engineering statistics

2. Course Code:

ENGC 227

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Presence

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

2 / 2

7. Course administrator's name

Name: Ali Ayad Abduljabar
E-mail: alibabeli@uomosul.edu.iq

8. Course Objectives

Course Objectives	1. Introduce the student to collecting and presenting statistical data **[I]** 2. Classifying and tabular the engineering information in a manner consistent with the data and the field of academic work **[I]** 3. an ability to conduct experiments, analyze and interpret data **[I III, VI]** 4. The ability to identify and solve engineering problems. **[I, III, VI]** 5. Take the appropriate decision through scientific analysis of information **[I, III, VI]**

9. Teaching and Learning Strategies

Strategy	1- Theoretical lectures 2- Discussion sessions 3- Assignments 4- Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Role of statistics in science, types of statistics, data presentation	Theoretical lectures	

2	2	**I**	Descriptive statistics, histogram frequency distribution, data limits, data tabulations, polygon, ogive.	Theoretical lectures	**Quiz**
3	2	**I, III, VII**	Basic Concepts of probabilistic theory (random events and sample space).	Theoretical lectures	**Activity**
4	2	**I**	Sets and probabilistic models, axioms of probability, rule of probability	Theoretical lectures	**Assignment**
5	2	**I**	The definition of conditional probability and their properties		**Quiz**
6	2	**I**	Multiplication rule, total probability theorem, Bayes' theorem	Theoretical lectures	
7	2		Midterm exam		
8	2	**I**	Three events, mutually and non-mutually events	Theoretical lectures	
9	2	**I**	Counting, permutation, combination	Theoretical lectures	**Activity**
10	2	**I**	The definition and classification of random variable (Discrete and Continuous), type of discrete distribution	Theoretical lectures	
11	2	**I**	Discrete probability distributions, Binomial and Poisson Distribution	Theoretical lectures	**Assignment**
12	2	**I**	Continuous distribution, normal distribution	Theoretical lectures	**Quiz**
13	2	**I, III, VII**	Test of hypothesis, types of errors in hypothesis testing, hypothesis tests of means	Theoretical lectures	**Assignment**
14	2	**I, III, VII**	Test of the mean with unknown population variance, hypothesis test of two means with known population variance.	Theoretical lectures	**Activity**
15	3		Final exam		

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

Assignment & Grading	**Method**	**NO**	**Weighting**	**GOs**		
				I	**III**	**VII**

	Activities	**3**	**2%**		**1**	**1**
	Assignment	**3**	**4%**		**2**	**2**
	Quiz	**2**	**4%**	**4**		
	Midterm exam	**1**	**30%**	**30**		
	Final exam	**1**	**60%**	**60**		
Total Marks			**100%**	**94**	**3**	**3**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Probability and Statistics for Engineers, Holický, Milan
Main references (sources)	**الراوي، خاشع محمود. 1989. المدخل الى الاحصاء. وزارة التعليم العالي والبحث العلمي. جامعة الموصل.**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:	
Engineering Mathematics I	
2. Course Code:	
ENGE228	
3. Semester / Year:	
2024 – 2023	
4. Description Preparation Date:	
30/3/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 / 3	
7. Course administrator's name	
Name: Rashad A. Alsaigh E-mail: rashad.alsaigh@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1) Student will be able to identify multivariable functions and find any partial derivative of such function with understanding of geometrical meaning of these derivatives. **[I]** 2) Student can identify multivariable functions critical points (maxima, minima, and saddle points.) **[I]** 3) Study can recognize complex number, variable, various functions, and also their representation on the complex plane. Student will have the ability to manipulate functions form to transform complex function representation from Cartesian form to polar or exponential form or vice versa. Also, he/she will be able to find complex roots, and any power of a complex variable. **[I, VI]** 4) Student will be able to identify continuous and analytic functions, and test if they are harmonic or not by satisfying Laplace equation. **[I, VI]** 5) Student will be able to identify even, odd, and periodic functions. **[I, III]** 6) Student will be able to represent periodic functions using trigonometric and complex Fourier Series representation. Also, will be able to represents aperiodic functions using Half range Fourier Series representation. **[I]** 7) Student will be able to use Fourier Transforms of various engineering functions. **[I, VI]** 8) Student can recognize, understand, and implement vector quantities and algebraic operations. He/She should be able to understand and use parametric representation of line, plane and curve in space. **[I, III]**

	9) student will be able to implement vector quantity derivatives to find velocity and acceleration. Also, he/she will understand the meaning of gradient, Div, and Curl of vector quantities. **[I, VI]**

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3-Computer software

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	I	Limits and continuity , Partial derivatives (definitions, functions of more than two variables), second and higher order partial derivatives.	**1+2+3**	**HW**
2	3	I	Chain rule for functions of two or three variables , Maxima and minima and saddle points.	**1+2+3**	**HW + Quiz**
3	3	I, VI	Complex analysis: Definitions and basic concepts, Cartesian form, polar form, exponential form, representations of a complex variable. Complex variables algebra, Roots of a complex number.	**1+2+3**	**HW**
4	3	I, VI	Complex analysis: complex functions, limits, derivatives and continuity of complex functions. Analytic functions, Cauchy-Riemann equations, derivatives of analytic functions. Laplace equation, Harmonic and conjugate harmonic functions.	**1+2+3**	**HW**
5	3	I, VI	Complex analysis: Rational functions, Logarithmic functions, Exponential functions.	**1+2+3**	**HW**
6	3	I, VI	Complex analysis: Trigonometric and hyperbolic functions, General power of complex variables.	**1+2+3**	**HW**
7	3	I, VI	Complex analysis: Integration along a line	**1+2**	**HW + Quiz**
8	3	I, III	Fourier Series: even and odd function , Half Wave Symmetry, periodic functions, definition of Fourier series, Trigonometric form	**1+2+3**	**HW**
9	3	I, III	Fourier Series: Line Spectrum (harmonic) the Fourier Series, Half wave symmetry, sum and shift of functions, Complex Exponential form of the Fourier Series	**1+2+3**	**HW + Quiz**
10	3	I, VI	Fourier Series: introduction to Fourier Transforms	**1+2+3**	**HW**
11	3	I, VI	Fourier Series: Fourier Transforms	**1+2+3**	**HW + Quiz**

12	3	**I, III**	Introduction to Vector Analysis: definition, notation, properties, Vector algebra: addition, subtraction, multiplications	**1+2**	**HW**
13	3	**I, III**	Introduction to Vector Analysis: vector algebra (continue) with applications	**1+2**	**HW**
14	3	**I, III**	Introduction to Vector Analysis: Vectors and Geometry, equation of line, plane, curve parameterization with geometric applications.	**1+2**	**HW**
15	3	**I, VI**	Introduction to Vector Analysis: vector function and field, derivative of vector functions, velocity, acceleration. introduction to gradient, Div, and Curl. Eigenvalues and Eigenvectors.	**1+2**	**HW + Quiz**

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**No**	**Percentage %**		
			I	**III**	**VI**
Assignment & Grading	Midterm exam	20	20		
	Homework	11	6	2	3
	In-Class activity / Classwork	5	0	1	4
	Quizzes	4	4	0	0
	Lab work	0	0	0	0
	Final exam	60	60		
Sum		100	90	3	7

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. E. Kreyszig, et al, "Advanced Engineering Mathematics," 10th ed., McGraw Hill, 2011. 2. George B. Thomas, Jr., "Thomas' Calculus Early Transcendentals," 13th Ed, 2014.
Main references (sources)	D.G. Zill, "Advanced Engineering Mathematics," 6th Ed, 2018
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Engineering Mathematics II
2. Course Code:
ENGE230
3. Semester / Year:
2024 - 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Present
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Rashad A. Alsaigh E-mail: rashad.alsaigh@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Student is able to recognize the underling rule of differential equations in real world problems, **[I, VI, VII]** 2. Student is able to classify the differential equations mathematically, the types of physical problems (IVP, BVP), and the difficulties of finding solutions. **[I, VI]** 3. Student is able to solve 1st order, homogeneous and non-homogeneous, linear and nonlinear, ordinary differential equations, **[I, VI]** 4. Student is able to solve 2nd order, homogeneous and non-homogeneous, linear ordinary differential equations, **[I, VI]** 5. Student is able to make Laplace transforms of various kinds of functions, **[I, VI]** **6**. Student is able to use Laplace transforms to solve any order , homogeneous and non-homogeneous, linear ordinary differential equations. **[I, VI]**

9. Teaching and Learning Strategies	
Strategy	1. Theoretical lectures 2. Discussion sessions 3. Computer Software

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
Week1	**4**	**I, VI, VII**	Definition and Classification of differential equation (ordinary and partial, order, degree, Linear and non-linear, homogeneous and non-homogeneous).	**1+2**	**HW + Seminar + Midterm**
Week2	**4**	**I, VI**	Solutions of 1st order linear ordinary differential equations, homogeneous and non-homogeneous. General and particular solutions.	**1+2+3**	**HW + CW + midterm**
Week3	**4**	**I, VI**	Solutions of 1st order nonlinear ordinary differential equations, homogeneous and non-homogeneous, using the method of Separation of Variables and and Exact and modified exact equations method.	**1+2+3**	**HW + CW + midterm**
Week4	**4**	**I, VI**	Solutions of 1st order nonlinear ordinary differential equations, homogeneous and non-homogeneous, using various methods of substitution.	**1+2+3**	**HW + CW + midterm**
Week5	**4**	**I, VI**	Various fields of applications of 1st order ordinary differential equations.	**1+2**	**HW + CW + Seminar + midterm**
Week6	**4**	**I, VI**	Solution of 2nd order, homogeneous, linear ordinary differential equations with constant coefficients.	**1+2+3**	**HW + CW + midterm**
Week7	**4**	**I, VI**	Solution of 2nd order, nonhomogeneous, linear ordinary differential equations with constant coefficients by the method of Undetermined coefficients.	**1+2+3**	**HW + CW + midterm**
Week8	**4**	**I, VI**	Solution of 2nd order, nonhomogeneous, linear ordinary differential equations with constant coefficients by the method of Variable of parameters.	**1+2+3**	**HW + CW + midterm**
Week9	**4**	**I, VI**	Possible solutions of boundary value problems. also, introduce the stability criteria of solution (its physical meaning in engineering systems). The dependence of stability and system behavior on the characteristic roots.	**1+2+3**	**HW + CW + midterm**
Week10	**4**	**I, VI, VII**	Various fields of applications of second order ordinary differential equations with solutions.	**1+2**	**HW + CW + midterm**
Week11	**4**	**I, VI**	Laplace transform: definition, versatility and application, Laplace Inverse Transform, using tables and partial fractions. Application of Laplace transform definition on various Geometric functions.	**1+2**	**HW + CW + midterm**
Week12	**4**	**I, VI**	Laplace Transform of derivatives, solution of linear ordinary differential equations using Laplace Transforms,	**1+2+3**	**HW + CW + midterm**

			1st-shifting theorem (Translation in S-domain).		
Week13	**4**	**I, VI**	Unit step function and its Laplace Transform. 2nd shifting theorem (Translation in t- domain), Laplace Transforms of derivatives.	**1+2+3**	**HW + CW + midterm**
Week14	**4**	**I, VI**	Laplace transforms of integrals (t-function integral and S-function integral), Convolution Theorem.	**1+2+3**	**HW + CW + midterm**
Week15	**4**	**I, VI**	Practices of applying Laplace inverse transform on various special functions.	**1+2+3**	**HW + CW + midterm**

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

	Method	**No**	**Percentage %**		
			I	**VI**	**VII**
Assignment & Grading	Midterm exam	15	15	0	0
	Homework	12	6	2	4
	In-Class activity / Classwork	5	1	0	4
	Quizzes	3	3	0	0
	Lab work	0	0	0	0
	Seminar	5	1	1	3
	Final exam	60	60	0	0
Sum		100	57	32	11

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	E. Kreyszig, et al, "Advanced Engineering Mathematics," 10th ed., McGraw Hill, 2011.
Main references (sources)	D.G. Zill, "Advanced Engineering Mathematics," 6th Ed, 2018.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Advance Heat Transfer
2. Course Code:
AHTR263
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Loay Bashir E-mail: loayaldabbagh@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) Understand properties of real substances, such as steam and ideal gases [I, II] 2) Learn how to use tabular data and equations of state [I, II] 3) Understand and use the process diagrams. [I, II] 4) Understand closed systems and control volumes. [I, II, VI] 5) Understand the first law and its basic applications. [I, II] 6) Understand the second law and its basic applications. [I, II, VI]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Computer laboratories 5-Projects 6-Industrial training

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	I, II, VI	Introduction to heat transfer		

2	3	I, II, VI	Introduction to heat transfer	Lecturer	Quizzes, Mid term, Final exam, Class Activity, Project.
3	3	I, II, VI	Introduction to conduction		
4	3	I, II, VI	One–dimensional, steady state conduction		
5	3	I, II, VI	One–dimensional, steady state conduction		
6	3	I, II, VI	Two-dimensional, steady state conduction		
7	3	I, II, VI	Two-dimensional, steady state conduction		
8	3	I, II, VI	Two-dimensional, steady state conduction		
9	3	I, II, VI	Midterm exam		
10	3	I, II, VI	Introduction to convection		
11	3	I, II, VI	Introduction to convection		
12	3	I, II, VI	Introduction to convection		
13	3	I, II, VI	Classification of heat exchangers		
14	3	I, II, VI	Classification of heat exchangers		
15	3	I, II, VI	Review		

11.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

Assignment & Grading	Method (Assessments)	No.	Marks	GOs		
				I	II	VI
	Midterm exam	1	15	12	3	
	project	1	6		4	2

	Class Activity	**4**	**4**	**2**	**2**	
	Quizzes	**5**	**15**	**15**		
	Final exam	**1**	**60**	**60**		
Total Mark			**100**	**89**	**9**	**2**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Çengel, Y. A. and Boles, M. A., Thermodynamics: an Engineering Approach, 6th ed., The McGraw-Hill Companies, New York, © 2008.
Main references (sources)	Bergman, lavine, Incropera and dewitt - Fundamentals of Heat and Mass Transfer, John Wiley & Sons, Inc., 7th Edition 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Electronic principles
2. Course Code:
ELCP204
3. Semester / Year:
2023−2024
4. Description Preparation Date:
3/4/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
Name: Dr. Zeyad M.Yousif Email : zmyousif@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objectives of this course are: 1. **Linked to GO I:** Use of knowledge from different topics including construction and principle of operation of diode, and its applications including clamper circuit, clipper circuit, rectifiers. Also BJT structure, BJT as amplifier to identify, formulate, and solve complex problems related to the DC and AC analysis of electronic devices. This competency will be assessed through the Midterm Exam, Quizzes, HomeWorks, and Final Exam. 2. **Linked to GO II** Acquire the general considerations and steps required in designing electronic circuits for different application in the field of interest such as rectifiers using diodes and amplifier based BJT device,. This competency will be assessed through the Final Exam. 3. **Linked to GO III** Develop and apply experimental skills, conduct experiments, and analyse/interpret data related to DC&AC electronic circuits based diodes and BJT devices . This competency will be assessed through the experimental work of lab, Mid-term and Final Exams. 4. **Linked to GO VII** Function effectively on multi-disciplinary teams to analyse problems, devise solutions, and meet deadlines within the context of electronic circuits. Apply collaborative problem-solving skills to

	topics related to the experimental work of electronics. This competency will be assessed through lab work

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Laboratory experiments 3- Homeworks 4-Exams 5-Reports

10. Course Structure (Theoretical Part)

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**I**	Introduction (Semiconductor Diodes, pn junction diode, Diode Applications, Rectifier circuits, clipper, clamper)	Theoretical Lectures	Quiz
2	**2**	**I**	Zener diode and its application (voltage regulator)	Theoretical Lectures	H.W and Quiz
3	**2**	**I, II**	Introduction to Bipolar junction transistors (BJT) and it is configurations	Theoretical Lectures	
4	**2**	**I, II**	DC analysis of BJT equivalent circuits (Introduction, operating point, Fixed-bias Configuration, Emitter-bias Configuration, Voltage-divider Bias Configuration, Collector Feedback Configuration, Emitter-follower Configuration (common collector).	Theoretical Lectures	H.W
5	**2**	**I, II**	AC analysis of BJT equivalent circuits	Theoretical Lectures	H.W

			part 1,introduction, equivalent model, re-model Fixed bias configuration, re-model Voltage-divider bias configuration		
6	**2**	**I**	AC analysis of BJT equivalent circuits part 2 (re-model CE Emitter-Bias configuration, 1) Un-bypassed situation. 2) bypassed configuration	Theoretical Lectures	H.W
7	**2**	**I**	re-model of Emitter-Follower Configuration, re model of common Base configuration , Re-model Collector Feedback C	Theoretical Lectures	H.W
8	**2**	**I**	Effect of RL And RS, Design example of the C.E amplifier circuit Multi stages transistor , Cascaded Systems Transistor as switch	Theoretical Lectures	
9	**2**	**II**	Field-Effect Transistor FET (Introduction and types) ,	Theoretical Lectures	H.W
10	**2**	**I, II**	Metal–Oxide–Semiconductor Field-Effect Transistor types of MOSFETs and Basic Construction and Basic Operation and	Theoretical Lectures	H.W
11	**2**	**I, II**	Characteristics of:- 1. Depletion-type MOSFET	Theoretical Lectures	H.W and Quiz

			(DMOSFET). Enhancement-type MOSFET (EMOSFET). Field-Effect Transistor Biasing part 1 Introduction. Fixed-Bias Configuration. Self-Bias Configuration. Voltage-Divider Biasing. Common-Gate Configuration.		
12	**2**	**I**		Theoretical Lectures	Exam
13	**2**	**I, II**	Field-Effect Transistor Biasing part 2 Depletion-Type MOSFETs. Enhancement-Type MOSFETs. Combination Networks. Design.	Theoretical Lectures	
14	**2**	**I, II**	Introduction to the operational amplifier, Practical OP-AMP Circuits, Applications of operational amplifier part1 (Inverting Amplifier, Non-inverting Amplifier, Unity Follower, Integrator, Differentiator	Theoretical Lectures	
15	2	**I**	Applications of operational amplifier part2 (Comparator, Voltage Subtraction, Voltage Summing, Multiple-Stage Gains, Constant-gain Multiplier...)	Theoretical Lectures	

Course Structure (Lab Work Part)					
Week	Hours	Required Learning Outcomes	Introduction to lab experiments and devices, Diode Test and Characteristics	Learning method	Evaluation method
1	**2**	**III, VII**	Diode Application (Clipper circuits)	Experiment	
2	**2**	**III, VII**	Diode Application (Clamper circuits)	Experiment	**Report 1** H.W
3	**2**	**III, VII**	Half and full wave rectifiers, Bridge Rectifiers	Experiment	
4	**2**	**III, VII**	BJT types and test, DC characteristcs of BJT	Experiment	**Report 2** H.W
5	**2**	**III, VII**	Common Emitter amplifier circuits (Fixed bais and Emitter self-bias configuarion),	Experiment	H.W
6	**2**	**III, VII**	Common Emitter amplifier circuits (Voltage Divider, Multistage transistors, Transistor as a switch	Experiment	**Report 3**
7	**2**	**III, VII**	JFET – Characteristics (1), JFET – Characteristics (2).	Experiment	H.W
8	**2**	**III, VII**	امتحان نصف فصلي	Exam	
9	**2**	**III**	MOSFET – Characteristics (1) MOSFET – Characteristics (2)	Experiment	**Report 4**
10	**2**	**III, VII**	JFET – Amplifier	Experiment	**Report 4**
11	**2**	**III, VII**	MOSFET – Amplifier	Experiment	
12	**2**	**III, VII**	Basic Chara. Of Operational Amplifier	Experiment	**Report 5**

13	**2**	**III, VII**	Applications of Op-AMP	Experiment	
14	**2**	**III, VII**	Applications of Op-AMP -2	Experiment	
15	**1**	**III,VII**		Experiment	

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method (Assessment)	**No**	**Mark**	**GO**			
				I	**II**	**III**	**VII**
Assignment & Grading	Midterm exam (Theoretical and lab)	1	32	25		7	
	HomeWorks and activities	9	8	8			
	Quizzes	6	5	5			
	Lab work (reports)	5	5			2	3
	Final exam (Theoretical and lab)	1	50	29	11	10	
Sum			100	67	11	19	3
GO%			100	100	100	100	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• R. L. Boylestad, Electronic Devices and Circuit Theory,11th Edition, Prentice Hall, 2009.
Main references (sources)	• Thomas L. Floyd , Electronic Devices , 9th Addition, Pearson Prentice Hall, 2005
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Fluid Mechanics
2. Course Code:
FLME251
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
Name: Dr. Laith Mohammed Jasim Email : jasiml68@uomosul.edu.iq
8. Course Objectives

Course Objectives	1)Understand the Fundamental fluid properties and their significance in Engineering and methods of fluid pressure measurement and calculation of forces on different surfaces. [I, VI]. 2) Know about the working of different types of devices used for the measurement of fluid flow [I, VI] 3) Performs pressure center and hydrostatic force calculations. [I] 4) Learn about the principles of designing dams and gates. Design of gate control systems. [I, II] 5) Identify the types of flow, the conditions governing them, and general hypotheses. [I, VI] 6) Apply the conservation of mass and energy and Newton's second law of motion to the contents of a finite control volume to get important answers. [I] 7) Performs pressure and velocity calculations using the conservation of mass equation and the Bernoulli equation for flow systems. [I, II]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I,II	Introduction; Fluid mechanics applications in science and mechatronics engineering; Matter; Solid and Fluid (liquid and Gas).	Theoretical lectures Discussion Sessions	Activity
2	2	I,II	Shear and normal stress, pressure; Definition of Fluid static and dynamic; Approaches to study fluid mechanics; Analytical method, Experiments, and Computation (Computation Fluid Dynamic, CFD); Definition of; Hydrodynamics, Hydraulics, Gas dynamics		Assignment
3	2	I,II	Shear and normal stress, pressure; Definition of Fluid static and dynamic; Approaches to study fluid mechanics; Analytical method, Experiments, and Computation (Computation Fluid Dynamic, CFD); Definition of; Hydrodynamics, Hydraulics, Gas dynamics		Quizzes
4	2	I,II	Fluid Properties; Mass Density, Specific Volume, Specific Weight, Specific Gravity; Idea Gas Law, Dynamic and Kinematic Viscosity, shear stress and velocity gradient,		Activity

			Newtonian and Non-Newtonian Fluids; Compressibility, Process (Isothermal and Isentropic)		
5	2	I,II	Fluid Static (Hydrostatics); Pressure definition; Pressure at a Point; Pressure Force on a Fluid Element, Equilibrium force of a Fluid Element; Body and Viscous force; Pressure variation in a Fluid at Rest for Incompressible and compressible Fluid.		Assignment
6	2	II,VI	Pressure Measurements; Barometer (Mercury and Aneroid Barometer), Piezometer Tube, U-Tube Manometer, Differential U-tube manometer, Inclined-tube manometer, Bourdon gage, Pressure transducers.		Quizzes
7	2	I,II,VI	Pressure distribution on flat surface surface; Hydrostatic Force on an Inclined Plane Surface of Arbitrary shape; resultant force and location of center of pressure, centroid and parallel axis theorem.		Activity
8	2	II,VI	Hydrostatic Force on Submerged Curve Surface		Assignment
9	2	I	Mid. Course Exam.		
10	2	I,II	Fluid Dynamics; Physical Quantities of Flow; Velocity, Pressure, Density, Temperature and		Activity

			Acceleration. Lagrangian and Eulerian Systems; Control volume method.		
11	2	I,II	Classification of Fluid Flow; Uniform and Non-uniform Flow, Steady and Unsteady Flow, One, two and three dimensional flows, Viscous and Inviscid Flow, Internal and External Flow, Laminar and Turbulent Flow (boundary layer), Compressible and Incompressible		Assignment
12	2	I,II	Elementary Equation of Motion; Differential and Control Volume Approach. Continuity Equation (Conservation of Mass) derivation, Volume and Mass Flow Rate, Momentum Flux, Applications on Conservation of Mass.		Quizzes
13	2	I,II,VI	Bernoulli Equation; limitations and the assumptions, Pressure head, Velocity head, Elevation head, Piezometric head, Total head, Hydraulic and Energy Grade lines. Application of the Bernoulli equation; Pitot Tube, Pitot-Static Tube (stagnation point), Fr		Activity

14	2	I,II	The Linear Momentum Equation (conservation of linear momentum) derivation, Newton's second law, Body and surface forces, The three components force. Application of the Linear Momentum Equation; steady-incompressible case, Flow on a pipe nozzle, Force due		Assignment
15	2	I	Final course Exam.		

11.
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	B.R. Munson, D.F. Young and T.H. Okiishi, Fundamentals of Fluid Mechanics, seventh edition, John Wiley & Sons, Inc., 2013
Main references (sources)	Frank M. White, Fluid Mechanics, seventh edition, McGraw-Hill, 2011
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description / Third level

1. Course Name:
Theory of Machines
2. Course Code:
THMH354
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
1- Name: Hassan Al-Siraj E-mail: saeedh81@uomosul.edu.iq 2- Name:Saad Zaghlul Saeed Al-Khayyat E-mail:saeeds70@uomosul.edu.iq
8. Course Objectives

Course Objectives	**Course Learning outcomes (Objectives):** 1) Student is able to understand the theory of Turning Moment diagram of intenrnal combustion engines and the versatility of the flywheel. **[I, II]** 2) Student is able to understand the operation principles and design of the Frictional clutches. **[I, II]** 3) Student is able to understand the operation principles and design of Belt drives. **[I, II]** 4) Student is able to understand the various designs of toothed gears, their various classifications, related terminologies, and calculate them. student is able to understand the operation principle and design considerations (e.g. analyze the interference between two toothed gears). **[I, II, VI , VII]** 5) Student is able to classify gear trains and their various use. Also, student is able to analyze and calculate related kinematics of gear trains. **[I, II]** 6) understand the operation principles of various other machine parts like Gyroscope and Cams.**[I, II, VI, VII]**

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I**	Turning Moment Diagram and Flywheel – 1	Theoretical lectures	Quiz
2	2	**II**	Turning Moment Diagram and Flywheel – 2	Theoretical lectures	Assignment
3	2	**I**	Rotational Balancing	Theoretical lectures	Quiz
4		**I**	Balancing at different plans	Theoretical lectures	Mid Exam
5	2	**I**	Belt drives: Flat belt	Theoretical lectures	Mid Exam
6	2	**I**	Belt drives: V-type	Discussion sessions	Mid Exam
7	2	**II**	Frictional clutches	Theoretical lectures	Assignment
8	2	**I**	Mid Tearm Exam		
9	2	**II**, **VI**	Toothed gears: pressure angle, gear law, sliding velocity between two teeth, path of contact, arc of contact, contact ration for involute gears.	Theoretical lectures	Quiz
10	2	**II**, **VI, VII**	Toothed gears: Standard systems, interference between two involute gears.	Theoretical lectures	Project
11	2	**I**	Gear train: Definition, law of speed ratio, reverted gear train, compound gear train.	Theoretical lectures	Quiz
12	2	**II , VI**	Gear train: Epicyclic gear train system.	Theoretical lectures	Assignment
13	2	**II , VII**	Gyroscope	Discussion sessions	Activity
14	2	**II , VI**	Cams	Theoretical lectures	Assignment
15	2	**I**	Final Exam		

11.Course Evaluation

Method (Assessments)	Marks	GOs			
		I	II	VI	VII
Midterm exam	15	15			
Mini Project	8		3	3	2
Assignment	5		2	3	
Activity	4		2		2
Quizzes	8	8			
Final exam	60	60			
	100	83	7	6	4
		100%	100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• R.S. Khurmi and J. K. Gupta, "1. Theory of Machines," 14th ed.; S. Chand & Co. Ltd., New Delhi, 2005.
Main references (sources)	• SS Rattan, "Theory of Machines," 4th ed, 2014.
Recommended books and references (scientific journals, reports...)	https://www.sciencedirect.com/journal/mechanism-and-machine-theory
Electronic References, Websites	http://www.digitallibrary.edu.pk/Index.php

1. Course Name:
Signal processing
2. Course Code:
SPRO361
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Dr. Aws Hazem Saber E-mail: aws.anaz@uomosul.edu.iq
8. Course Objectives

Course Objectives	1-Deal with basic digital processing techniques for the mechatronic system.[I,II,V] 2-Learn Z- and Discrete Fourier transforms and their application. [II,III,V] 3-Design FIR and IIR digital filters to meet arbitrary specifications. [I,II,VI] 4-Design and implement digital signal processing algorithms for various applications. [III,VI,VII]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	I,II	Introduction to signal processing	Theoretical lectures	HW

2	**3**	I,II,V	Analaog and Digital Signal Processing 1- ADC blocks 2-Sampling Theorem 3-Example	Theoretical lectures	EXAM
3	**3**	I,II, VI	D. Signals Representation 1-Graphical representation 2-Functional representation 3-Tabular representation 4-Sequential (Vector) representation Common D. Signals 1- Unit step signal 2- Impulse signal 3- Ramp signal 4- Exponential signal	Theoretical lectures	HW
4	**3**	I,VII	Discrete time signals manipulation 1-Shifting 2-Reversal 3-Time Scaling 4-Addition 5-Amplitude scaling 6-Multiplication 7-Unit delay element & Unit advance	Theoretical lectures	EXAM
5	**3**	I, VII	DISCRETE-TIME SYSTEMS 1-discrete-time systems as blocks 2-discrete-time systems types	Theoretical lectures/ Discussion sessions	CW
6	**3**	I , VI,VII	Properties of DISCRETE-TIME SYSTEM 1-System Causality	Theoretical lectures	Exam

			2-System stability 3-Linear Systems 4-Time invariant system 5-LTI Systems		
7	**3**	I , VI,VII	Convolution 1-Convolution utilization 2-Convolution conditions 3-Methods of Convolution 4-Graphical Method Convolution	Theoretical lectures/ Discussion sessions	HW
8	**3**		Convolution (cont.) 1-Methods of Convolution	Theoretical lectures/ Discussion sessions	CW
9	**3**	I,II,V	2-Slide Rule Method Deconvolution 1-Methods of Deconvolution 2-Iterative Method 3-The Graphical Method Term Exam	Theoretical lectures/ Discussion sessions	HW
10	**3**	I, V	Linear Constant-Coefficient Difference Equations 1-Solution of First-order LCCDE 2-Solution of Nth -order LCCDE	Theoretical lectures	EXAM
11	**3**	I,II,V	Z-Transform, properties, examples on classical discrete-time signals, ROC and inverse Z-Transform	Theoretical lectures	HW

12	**3**	I,II,V	Discrete-time LTI system analysis using the Z-variable. System function and its relationshipto other forms of time- and frequency-domain representations.	Theoretical lectures	CW
13	**3**	I, V	Digital Filters: IIR and FIR filters, stability and linear- phase properties of FIR filters againstfast roll-off and low order properties of IIR filters.	Theoretical lectures	EXAM
14	**3**	I,II,V	Design of IIR filters: numerical methods, IIR digital filters via bilinear transformation of classical analogue filters (Butterworth, Chebyshev, and elliptic), and impulse invariant method.	Theoretical lectures	HW
15	**3**	I,II,V	Design of FIR filters: windowing and frequency sampling method. Realizations of IIR and FIR filters.	Theoretical lectures	CW

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Methods	**No**	**Percentage %**
Assignment & Grading	**Midterm exam**	20	20 %
	Assignments (Homework) + project	8	8 %
	Activities	6	6 %

	Quizzes	6	6 %
	Final exam	60	60 %

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• "Discrete-Time Signal Processing," Alan V. Oppenheim, Ronald W. Schafer and John R. Buck second edition 1999, ISBN 0-13-754920-2
Main references (sources)	• "Signal Processing First," James H. McClellan, Ronald W. Schafer, Mark A.Yoder, Pearson/ Prentice Hall, c20032003 ISBN 0130909998. • "Digital Signal Processing: Principles, Algorithms, and Applications," John G. Proakis, Dimitris K Manolakis, 1995.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
PC Interface and Data Acquisition
2. Course Code:
PCID464
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Zead Mohammed Yosif E-mail: zmyousif@uomosul.edu.iq
8. Course Objectives

Course Objectives	The students after successfully complete the course are able to: 1-Linked to Go I Have deep understanding of PC Interface systems and types. This objective will achieve the GO I through the Quizzes, Midterm exam and Final exam. 2-Linked to Go II & III Acquire the ability to develop pc interfaces software using various Programming language. This objective will achieve the GOII & III through the Assignment, and Activity. 3-Linked to Go III Design and Model Parts or Whole Mechatronic System. This objective will achieve the GO III through the final project.

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Projects 5- Quizzes. 6- Assignments

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I**	Introduction to Data Acquisition on the PC	Theoretical lecture	
2	2	**I, II**	Analog Signal Transmission, Wire and cable options, Noise and Ground, Zero and Span cct(Inverting Summer, Instrument Amplifier),	Theoretical lecture	Homework
3	2	**I**	Signal Condationing, Isolation Amplifier, Transformer-coupled Amplifiers, Optically Coupled Amplifiers	Theoretical lecture	Quiz
4	2	**II, III**	Analog to Digital and Digital to Analog Conversion: Sample and Hold circuits, Analog, multiplexers/demultiplexers	Theoretical lecture	**Classwork and discussion**
5	2		Analog to digital Converters, Digital to analog Converters, Examples of sensors with signal conditioned output	Theoretical lecture	
6	2	**II ,III**	Microprocessor Addressing System: Memory Mapped Addressing, I/O Addressing.	Theoretical lecture	Homework
7	2	**I**	Mid-Term Exam	Theoretical lecture	**Midterm exam**
8	2		Address decoder Design, Assembly Language for I/O		
9	2	**I**	Programmable Peripheral Interface(PPI), Advantage, Addressing	Theoretical lecture	**Quiz**
10	2	**II , III**	PPI Examples	Theoretical lecture	**Classwork and discussion**
11	2		Computer Parallel Port: Architecture	Theoretical lecture	
12	2	**II, III**	Computer Parallel Port: programming and examples	Theoretical lecture	Homework
13	2		Computer Serial Port: Architecture	Theoretical lecture	

14	2		Computer serial Port: programming and examples	Theoretical lecture	
15	2	I	Computer Game Port: Architecture, programming, and examples	Theoretical lecture	Quiz

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs		
				I	II	III
Assignment & Grading	**Activities**	**2**	**5%**		**4**	**1**
	Assignment	**3**	**5%**		**2**	**3**
	Quiz	**3**	**5%**	**5**		
	Midterm exam	**1**	**20%**	**20**		
	Lab work	**15**	**15%**	**5**		**10**
	Final exam	**1**	**50%**	**40**		**10**
Total Marks			**100%**	**70**	**6**	**24**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Kevin James, "PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control"
Main references (sources)	• In the library, there are many Automations books that can be used as reference books
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Numerical Analysis
2. Course Code:
ENGE320
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
Name: Dr. Laith Mohammed Jasim Email: jasiml68@uomosu.edu.iq
8. Course Objectives

Course Objectives	1-Derive numerical methods for various mathematical operations and tasks, such as curve fitting n, differentiation, and integration. [I, VI]. 2-The solution of linear and nonlinear equations [I]. 3- The solution of differential equations [I, VI]. 4-Analyze and evaluate the accuracy of common numerical methods [I].

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3- Assignment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I, VI	Concepts and role for the numerical method in engineering, approximations and errors, the definition of Round-off error and truncation error, absolute and relative	Theoretical lectures Discussion sessions	Assignment Activity

			true/approximation error.		
2	2	I, VI	Numerical solution of Nonlinear algebraic equations (Root of equations): Bracketing methods (Bisection, and False-position method).	Theoretical lectures Assignment	Quizzes
3	2	I, VI	Open methods (Newton-Raphson and secant method).	Theoretical lectures Discussion sessions	Assignment
4	2	I, VI	Numerical solution of linear algebraic equations (system): The difference between the direct and indirect methods, singular and ill/well-conditioned system, partial and complete pivoting, convergence criteria, Jacobi iteration method.	Theoretical lectures Discussion sessions	Activity Quizzes
5	2	I, VI	The gauss-Seidel iterative method, Gauss-Seidel iterative with the relaxation factor method, Tri-diagonal system and its solution.	Theoretical lectures Assignment	Assignment
6	2	I, VI	Curve Fitting: Classification of Curve Fitting (Regression and Interpolation), the concepts of regression, and Least Square Criterion, Linear Regression.	Theoretical lectures Discussion sessions	Assignment

7	2	I, VI	Nonlinear Regression, popular nonlinear regression models (Exponential, Power, Growth, and Polynomial model), the linearization of the first three nonlinear models, Polynomial regression.	Theoretical lectures Discussion sessions	Activity Quizzes
8	2	I, VI	Introduction to Interpolation: Cubic Spline Interpolation (Cheney and Kincaid Formula)	Theoretical lectures Discussion sessions	Assignment
9	2	I, VI	Numerical Integration: Trapezoidal Rule (equal and non-equal segment width), Simpson's1/3 rule (equal and non-equal segment width).	Theoretical lectures Assignment	Assignment Activity
10	2	I, VI	Numerical Differentiation: Tayler series and truncation error, the approximation of the first derivative (FDA, BDA and CDA), the approximation of the second derivative (FDA, BDA and CDA).	Theoretical lectures Discussion sessions	Assignment
11	2	I, VI	Numerical Solution of Ordinary Differential Equation (ODE): Classification of Differential Equation (Initial Value Problem "IVP" and Boundary	Theoretical lectures	Assignment

			Value Problem "BVP"), the numerical methods for solving the IVP (Euler's)		
12	2	I, VI	Fourth-Order Runge-Kutta method for solving the IVP, Numerical solution for the system of ODEs with the two methods above.	Theoretical lectures Discussion sessions	Assignment
13	2	I, VI	The numerical methods for solving the BVP: The shooting method adaptation together with the two above methods used to solve the IVP.	Theoretical lectures Assignment	Assignment
14	2	I, VI	Introduction to another methods (finite difference, finite volume, finite element method)	Theoretical lectures	Assignment Activity
15	2	I, VI	Final Exam.		Final exam

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Steven C. Chapra and Raymond P. Canale, Numerical Methods for Engineering: with Software and Programming Application, Fourth edition, 2003.
Main references (sources)	• Steven T. Karris, Numerical Analysis Using Matlab and Excel, Third Edition, 2007
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Mechanisms and Vibration
2. Course Code:
MEVI300
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
1- Name: Saad Zaghlul Saeed Al-Khayyat E-mail:saeeds70@uomosul.edu.iq
8. Course Objectives

Course Objectives	The students who successfully fulfill the course requirements will: The students who successfully fulfill the course requirements will: 1) Gain knowledge about different mechanisms, and understand the rigid body motion of planar mechanisms,**[I, II, VI]** 2) Gain an ability to apply the kinematics and kinetic analysis to plan mechanisms. **[I, VII]** 3) Gain and ability to specify the degree of freedom of a system. **[I, II,VI]** 4) the student can recognize the vibrational motion and its kind. **[I, VI]** 5) the student can formulate, solve, and interpret the behavoir of sing degree of freedom system. **[I, II]**

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Mechanisms-1: Types, Characteristics, and applications	**Theoretical lectures**	home works

2	2	I	Mechanisms-2: Types, Characteristics, and applications	**Theoretical lectures**	home works
3	2	II	Velocity analysis: Instantaneous method center.	**Theoretical lectures**	term exam
4	2	II	Velocity analysis: Relative velocity method.	**Theoretical lectures**	term exam
5	2	I	Acceleration analysis: Calculation of linear and angular accelerations for points on mechanisms.	**Theoretical lectures**	term exam
6	2	II	Acceleration analysis: Introductory Examples	**Discussion sessions**	Activity
7	2	II, VI, V II	Acceleration analysis: detailed Examples, calculation of efficiency and power transmission.	**Discussion sessions**	Mini project
8	2	I, II	Mid Term Exam		
9	2	I	SDF – Free undamped motion: Theory and derivation of system equation	**Theoretical lectures**	Quizzes
10	2	II	SDF – Free undamped motion: Solution of equation, examples.	**Theoretical lectures**	Quizzes
11	2	II	SDF – Free damped motion: Theory and derivation of system equation.	**Theoretical lectures**	home works
12	2	VI	SDF – Free damped motion: Solution of equation, examples.	**Discussion sessions**	home works
13	2	I, II	SDF – Forced motion: introductory lecture to the topic.	**Theoretical lectures**	Quizzes
14	2	VI	MDF – systems: introductory lecture to the topic.	**Theoretical lectures**	home works
15	2	I, II	MDF – systems: introductory lecture to the topic.		

11.Course Evaluation

	i	ii	vi	vii	Sum
Quizzes	4	2			6
home works	0	4	2		6
Mini project	0	5	1	2	8
term exam	5	10			15

Activity	0	3		2	5
Lab term exam		0			0
final exam	24	36			60
Total	33	60	3	4	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. R.S. Khurmi and J. K. Gupta, "Theory of Machine," 14th ed.; S. Chand & Co. Ltd., New Delhi, 2005. 2. SS Rattan, "Theory of Machines," 4th ed, 2014. 3.S. Rao, “Mechanical Vibrations”, 6th Ed,2018.
Main references (sources)	• John J. Uicker, Jr., "Theory of Machines and Mechanisms," 5th ed, 2017. • Haym Benaroya, "Mechanical Vibration, Analysis, Uncertainties, and Control," 2018. • J. Hannah and R.C. Stephens, "Mechanics of Machines: Elementary theory and examples," 1978.
Recommended books and references (scientific journals, reports...)	https://www.sciencedirect.com/journal/mechanism-and-machine-theory
Electronic References, Websites	http://www.digitallibrary.edu.pk/Index.php

1. Course Name:
Mechanical Eng. Lab.
2. Course Code:
MLAB301
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 1
7. Course administrator's name
Name: Dr. Laith Mohammed Jasim E-mail: jasiml68@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) Identify measuring devices and how they work. [III]. 2) An ability to properly compose a technical report.. [IV]. 3) An ability to conduct experiments in the areas of Mechanical Engineering. [III, VII]. 4) Gain the necessary experience to compare practical results with theory. [I] 5) An ability to work adequately on teams and to set up objectives plan activities, and meet due dates. [VII].

9. Teaching and Learning Strategies	
Strategy	1- Theoretical lectures 2- Laboratory experiments

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I, III, IV, VII**	Friction on Inclined Plane	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
2	2	**I, III, IV, VII**	Torsion of Bar	Theoretical lectures Laboratory experiments	Lab. work Experiment .report

3	2	**I, III, IV, VII**	Hook's Law	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
4	2	**I, III, IV, VII**	Reaction of Beams	Theoretical lectures Laboratory experiments	Lab. work Experiment .report
5	2	**I, III, IV, VII**	Impact Test	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
6	2	**I, III, IV, VII**	Fatigue Test	Theoretical lectures Laboratory experiments	Lab. work Experiment .report
7	2	**I, III, IV, VII**	One Dimensional Heat Conduction	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
8	2	**I, III, IV, VII**	Transient Heat Transfer	Theoretical lectures Laboratory experiments	Lab. work Experiment .report
9	2	**I, III, IV, VII**	Force Convection from a Cylinder in a Cross Flow	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
10	2	**I, III, IV, VII**	Centrifugal Pump Performance	Theoretical lectures Laboratory experiments	Lab. work Experiment .report
11	2	**I, III, IV, VII**	Verification of Bernoulli Equation	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
12	2	**I, III, IV, VII**	Venturi Meter Apparatus	Theoretical lectures Laboratory experiments	Lab. work Experiment .report

13	2	**I, III, IV, VII**	Impact of a Jet	Theoretical lectures Laboratory experiments	Lab. Work Experiment report
14	2	**I, III, IV, VII**	Losses in Piping Systems	Theoretical lectures Laboratory experiments	Lab. work Experiment .report
15	2	**I**	Final Exam		Final exam

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1- كتاب تجارب في الهيدروليك
Main references (sources)	• Technical Documents for Laboratory Equipment
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Measurement and Instrumentations

2. Course Code:

MEIN303

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

26/3/2024

5. Available Attendance Forms:

Presence

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

4 / 3

7. Course administrator's name

1- Name: Dr. Saad Ahmed Al Kazzaz
E-mail: kazzazs60@uomosul.edu.iq

2- Name: Mr. Bilal Rabah Yahya
E-mail :bilal.altamer@uomosul.edu.iq

8. Course Objectives

Course Objectives	The students who finish this course will be able: 1.To work with different components of modern measurement systems (Go I, II) 2.To understand the instrumentations concepts as parts of control system field. (Go I,II, III) 3.To perform different experments using differents types of sensors. (Go I, III, VI)

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Units and Dimensions, type of instruments	Lecture	

2	2	I	Characteristics of instrument or transducers, Static and dynamic characterstics	Lecture	Homework
3	2	I	Errors in measurement systems, Sources of measurement noise, Techniques for reducing measurement noise	Lecture	Quiz
4	2	I	Sensors and Transducers, Sensor Categories, Position and displacement Transducer	Lecture	
5	2	I, II, VII	Resistance, inductance and capacitance measurement	Lecture	Quiz
6	2	I	Bridge circuits	Lecture	
7	2	I, II, VII	Current measurement, frequency and phase measurement	Lecture	Homework
8	2	I	Strain gauges, Force Sensors.	Lecture	
9	1	I	Midterm exam		
10	2	I, II, VII	Torque sensors and design problem on strain gauges.	Lecture	
11	2	I, II, VII	Rotational motion transducers, Rotational displacement and velocity, Absolute angular displacement and Velocity, Gyroscope	Lecture	
12	2	I	Capacitive, resistive and magnetic sensors, Hall effect sensor	Lecture	Quiz
13	2	I	Piezoelectric transducers, Ultrasonic transducers range and level measurement	Lecture	Homework
14	2	I	Level measurement and Pressure measurement	Lecture	
15	3	I	Final Exam		

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	III	Units and Dimensions, type of instruments	Laboratory experiments	
2	2	III	Characteristics of instrument or transducers,	Laboratory experiments	Lab Reports

			Static and dynamic characterstics		
3	2	III	Errors in measurement systems, Sources of measurement noise, Techniques for reducing measurement noise	Laboratory experiments	Lab Reports
4	2	III	Sensors and Transducers, Sensor Categories, Position and displacement Transducer	Laboratory experiments	Lab Reports
5	2	III	Resistance, inductance and capacitance measurement	Laboratory experiments	Lab Reports
6	2	III	Bridge circuits	Laboratory experiments	Lab Reports
7	2	III	Current measurement, frequency and phase measurement	Laboratory experiments	Lab Reports
8	2	III	Strain gauges, Force Sensors.	Laboratory experiments	Lab Reports
9	1	I	Midterm exam		Lab Midterm Exam
10	2	III	Experiment #7 Measurement of Force and Torque using different types of sensors.	Laboratory experiments	Lab Reports
11	2	III	Experiment #8 Measurement of rotational velocity and displacement.	Laboratory experiments	Lab Reports
12	2	III	Experiment #9 Measurement of displacement using proximity magnetic sensors and Hall effect sensor.	Laboratory experiments	Lab Reports
13	2	III	Experiment #10 Measurement of temperature and humidity using different types of sensors.	Laboratory experiments	Lab Reports
14	2	III	Experiment #11 Measurement range using ultrasonic transducers	Laboratory experiments	Lab Reports
15	3	I	Final Exam		Final Lab Exam

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting		GOs		
				I	II	III	VI
Assignment & Grading	Quizzes	**3**	**6%**	**6**			
	Homework	**3**	**6%**	**3**	**3**		
	Lab Reports	**8**	**8%**	**4**		**4**	
	project	**1**	**3%**		**2**		**1**
	Lab Term Exam	**1**	**7%**	**2**		**5**	
	Midterm Exam	**1**	**20%**	**12**	**8**		
	Final Exam	**1**	**50%**	**50**			
Total Marks			**100%**	**77**	**13**	**9**	**1**
GOs %			%100	%100	%100	%100	%100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• "Measurement and Instrumentation Principles" Third edition, by Alan S. Morris, 2001 • "Introduction to Instrumentation Measurement", Second Edition by Robert B. Northrop, 2011.
Main references (sources)	• "The Measurement Instrumentation and Sensors Hand Book" by John G. Webster
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Hydraulic and Pneumatic Systems
2. Course Code:
HPNS355
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
Name: Dr. Hassan M. Al-Siraj E-mail: saeedh81@uomosul.edu.iq
8. Course Objectives

Course Objectives	Student who finish this course should: 1) Recognize various types of fluid power circuits, their components, and the function of each component. **[I, II]** 2) Distinguish the preparation section components and the function of each component in a circuit. **[I, II, VI]** 3) Recognize various types of valves: directional, non-return, flow, pressure, and other combination control valves. Also identify the function of each of these valves in a circuit. **[I, II, , VI]** 4) Select the proper actuator for a fluid power circuit including special duty actuators. **[I, II, VI]** 5) Recognize various basic industrial and workshop fluid power circuits, and their special duty. **[II, VI]** 6) Read and symbolize various fluid power circuit and their components. **[II, IV]**

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Lab visiting 3-Computer modeling software 4-industrial learning videos
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I, II	Introduction to fluid power systems, DCV designation	1 + 2 + 3	HW
2	2	I, II, VI	Working media fluid flow, DCV Classification	1 + 2 + 3	CW
3	2	I, II, VI	Working media power generation unit and components. DCV usage, selection, and performance	1 + 2 + 3	HW + CW
4	2	I, II, VI	Non-return Valves	1 + 2 + 3 + 4	HW + CW + Quiz
5	2	I, II, VI	flow control valves-1	1 + 2 + 3 + 4	CW
6	2	I, II, VI	flow control valves-2	1 + 2 + 3 + 4	HW + CW
7	2	I, II, VI	Mid term exam		
8	2	I, II, VI	pressure control valves-1	1 + 2 + 3 + 4	CW
9	2	I, II, VI	pressure control valves-2	1 + 2 + 3 + 4	HW + CW
10	2	I, II, VI	other types of valves	1 + 2 + 3 + 4	Quiz
11	2	I, II, VI	electric and PLC – control	1 + 2 + 3 + 4	HW
12	2	I, II, VI	Actuators - 1	1 + 2 + 3 + 4	HW
13	2	I, II, VI	Actuators - 2	1 + 2 + 3 + 4	HW + CW
14	2	I, II, VI	Actuators - 3	1 + 2 + 3	HW + CW + Quiz
15	2	II, IV	preliminary design considerations	1	HW

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	No	Percentage %		
			I	II	VI
Assignment & Grading	Midterm exam	15	8	7	0
	Homework	12	5	5	2
	In-Class activity	6	2	2	2
	Quizzes	7	5	2	0
	Lab work	0	0	0	0
	Final exam	60	40	20	0
Sum		100	60	36	4

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Anthony Esposito, Fluid Power with Applications, 7th ed., 2014.
Main references (sources)	• Festo Didactics, various level textbooks, and workbooks
Recommended books and references (scientific journals, reports...)	Festo Didactics, various level textbooks, and workbooks
Electronic References, Websites	LunchBoxSession.com/youtube sites

1. Course Name:

Design of Machine Elements I

2. Course Code:

DMEL350

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

26/3/2024

5. Available Attendance Forms:

Presence

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

3 / 3

7. Course administrator's name

Name: Mr. Ahmad Wadollah S. Al-Sabawi
E-mail: ahmadalsabawi@uomosul.edu.iq

8. Course Objectives

Course Objectives	**1. Link to GO I, II and VI** At the end of the course, student must be able to: Understand basic concepts of machine design and analysis. **2. Link to GO III, IV and V** Gain a basic idea about the available engineering analysis packages. Get a basic method for analysis of any mechanical device. Learn and gain engineering morals and ethics.

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects and class activity

10. Course Structure

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

1	3	**I, II, III, V and VI**	The Nature of Mechanical Design	Lectures	
2	3	**I, II, III, V and VI**	Materials in Mechanical Design	Lectures	
3	3	**I, II, III, V and VI**	Stress and deformation Analysis 1	Lectures	hw
4	3	**I, II, III, V and VI**	Stress and deformation Analysis 2	Lectures	quiz
5	3	**I, II, III, V and VI**	Combined Stresses and Mohr's Circle	Lectures	hw
6	3	**I, II, III, V and VI**	Design of Different Types of Loadings 1	Lectures	
7	3	**I, II, III, V and VI**	Design of Different Types of Loadings 2	Lectures	
8	3	**I, II, III, V and VI**	Columns	Lectures	quiz
9	3	**I, II, III, V and VI**	Midterm Exam	Lectures	Midterm exam
10	3	**I, II, III, V and VI**	Shaft Design 1	Lectures	
11	3	**I, II, III, V and VI**	Shaft Design 2	Lectures	hw
12	3	**I, II, III, V and VI**	Belt Drives	Lectures	
13	3	**I, II, III, V and VI**	Chain Drives	Lectures	quiz
14	3	**I, II, III, V and VI**	Keys and Couplings	Lectures	
15	3	**I, II, III, V and VI**	Final Exam		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**NO**	**Weighting**	**GOs**		
				I	**II**	**VII**
Assignment & Grading	**Class Activities**	**1**	**5%**		**3**	**2**
	Assignment	**3**	**3%**		**2**	**1**
	Quiz	**3**	**12%**	**12**		

	Project	**1**	**5%**	**5**		
	Midterm exam	**1**	**15%**	**15**		
	Final exam	**1**	**60%**	**60**		
Total Marks			**100%**	**92**	**5**	**3**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Machine Elements in Mechanical Design, Robert L. Mott, 6th Ed. 2008
Main references (sources)	• Shigley's Mechanical Engineering Design, Budynas and Nisbett, 8th, 2006.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://ocw.mit.edu/courses/2-72-elements-of-mechanical-design-spring-2009/

1. Course Name:
Communications Engineering
2. Course Code:
COEN365
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Dr. Muhamad Azhar Abdilatef E-mail: Muhamad.azhar@uomosul.edu.iq
8. Course Objectives

Course Objectives	1) Adequate knowledge in Communication system concepts ,.(**I, II**). 2) Ability to design and implement netwoks under realistic constraints and conditions ,.(**I, II, V**). 3) Ability to understand the details of digital and analog signals ,.(**II, IV, V**) . 4) Ability to devise, select, and use modern techniques and tools needed for communication system,.(**VI**).

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	**I**	Communication Systems	Theoretical lectures	HW
2	3	**I, V**	Signals and Its Categories	Theoretical lectures	EXAM

3	3	**I, V**	Analog Communications	Theoretical lectures	HW
4	3	**II, V, VII**	Analog modulation: Amplitude modulation frequency modulation, phase modulation	Theoretical lectures	EXAM
5	3	**II, V, VII**	Digital Signaling and Circuits	Theoretical lectures/ Discussion sessions	CW
6	3	**I, II, V, VII**	Analog to digital conversion, quantizing, encoding.	Theoretical lectures	Exam
7	3	**II, Vو**	Digital Modulation	Theoretical lectures/ Discussion sessions	HW
8	3	**I وII, V, VII**	Fiber Optics	Theoretical lectures/ Discussion sessions	CW
9	3	**I, V, VII**	Principles of Networking, Networks Categories	Theoretical lectures/ Discussion sessions	HW
10	3	**I, VII**	Protocols, Standards, Standards Organizations, Internet Standards	Theoretical lectures	EXAM
11	3	**I, VII**	Network Models	Theoretical lectures	HW
12	3	**I V, VII**	Network Layers	Theoretical lectures	CW

13	3	**I, II, VII**	Ethernet	Theoretical lectures	EXAM
14	3	**I, II**	Wireless Networks	Theoretical lectures	HW
15	3	**I, VII**	Applications of Networking and Communication in Mechatronics	Theoretical lectures	CW

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**No**	**Percentage %**
Assignment & Grading	**Midterm exam**	20	20 %
	Assignments (Homework) + project	10	10 %
	Activities	5	5 %
	Quizzes	5	5 %
	Final exam	60	60 %

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Behrouz A. Forouzan: Data Communication and Networking, 4th edition
Main references (sources)	• B. Sklar, Digital Communications: Fundamentals and Applications, 2nd Ed., Prentice Hall, 2001. • L. W. COUCH II, Digital and Analog Communication Systems, 6th Edition, Prentice Hall.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
English Language Intermediate
2. Course Code:
3. Semester / Year:
2023-2024
4. Description Preparation Date:
3-4-2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
Name: Dr. Omar Saadallah E-mail: omar.abdulwahid@uomosul.edu.iq
8. Course Objectives

Course Objectives	**The Objectives of this course is to:** **1- Linked to GO I** Use the of knowledge reading and communicate on accurate information from a medium-length book. As well as read a medium-length general interest article, find new vocabulary items, and determine their meaning from the context. Furthermore, write a narrative account of past experiences or events, in a coherent and cohesive text of up to 3 paragraphs. In addition to giving the background to events then describe the main events, appropriately using past simple and past continuous. Finally, use of grammar to produce grammar structures that includes various tenses such as present, past, future, and preset perfect. This competency will be assessed through the Midterm Exam, Quizzes, HomeWorks, and Final Exam **2- Linked to GO IV** Use the of knowledge to do writing based on the tasks from book as well as performing oral discussion on different topics. This competency will be assessed through ClassWorks and discussion

9. Teaching and Learning Strategies	
Strategy	Theoretical lectures Discussion HomeWorks and ClassWorks Exams
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Chapter one (tenses) A world of difference	Theoretical lectures	
2	2	I	Chapter one (tenses) A world of difference	Theoretical lectures	**H.W**
3	2	I	Chapter two (Present tenses) The working week	Theoretical lectures	
4	2	I	Chapter two (Present tenses) The working week	Theoretical lectures	**H.W**
5	2	I	Chapter three (Past tenses) Good times, Bad times	Theoretical lectures	**C.W**
6	2	IV	Chapter three (Past tenses) Good times, Bad times	Discussion	**Discussion**
7	2	I	Chapter four (Advice, obligation, and permission) Getting it right	Theoretical lectures	H.W
8	2	I	Chapter four (Modal verbs) Getting it right	Theoretical lectures	
9	2	I	Chapter five (Future forms) Our changing world	Theoretical lectures	Quiz
10	2	I	Mid-term Exam		Exam
11	2	I	Chapter six (Information questions) What matters to me	Theoretical lectures	H.W
12	2	I	Chapter six (Information questions) What matters to me	Theoretical lectures	
13	2	I	Academic Writing	Theoretical lectures	H.W
14	2	I	Academic Writing	Theoretical lectures	H.W
15	2	I	Academic Writing	Theoretical lectures	
11.Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, Homeworks and Classworks, daily oral, monthly, or written exams, reports.

	Method (Assessment)	**No**	**Mark**	**GO**	
				I	**IV**
Assignment & Grading	Midterm exam	1	20	20	
	HomeWorks	6	5	5	
	ClassWorks and Discussion	1	10		10
	Quizzes	1	5	5	
	Final exam	1	60	60	
Sum			100	90	10
GO%			100	100	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	New Headway Intermediate Student's Book
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Control Systems
2. Course Code:
CONS352
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
Name: dr. Firas Ahmed Al-Durze E-mail: dr.firasaldurze@uomosul.edu.iq
8. Course Objectives

Course Objectives	Student who finish this course should: 1-Define and explain feedback and feed-forward control architecture and discuss the importance of performance, robustness and stability in control design [I] 2-Interpret and apply block diagram representations of control systems and design PID controllers based on empirical tuning rules [I II III VI] 3-Compute stability of linear systems using the Routh array test and use this to generate control design constraints [I III] 4-Use Evans root locus techniques in control design for real world systems [I II III VI] 5-Compute gain and phase margins from Bode diagrams .[I II II VI] 6-Design Lead-Lag compensators based on frequency data for an open-loop linear system.[I II III VI]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	I	Introduction to control system.	Theoretical lectures	HW
2	4	I	Mathematical model of physical system, mechanical system I.	Theoretical lectures	HW
3	4	I	Mathematical model of physical system, electrical system II.	Theoretical lectures	HW
4	4	I	Block diagram, Block diagram reduction.	Theoretical lectures	HW
5	4	I	Closed loop system subjected to disturbance, multivariable system	Theoretical lectures	HW
6	4	I	Signal flow graph representation, mason gain formula	Theoretical lectures	Exam
7	4	I III	Modeling in state space	Theoretical lectures	HW
8	4	I III	Transient response analysis, First order system	Theoretical lectures	**HW**
9	4	I III	Transient response analysis, second order system, Damping ratio and natural frequency	Discussion sessions	**CW**
10	4	I III	Definition of transient response, specifications, impulse response and dominant poles	Theoretical lectures	HW
11	4	I III	Steady- state error in unity feedback.	Theoretical lectures	Exam
12	4	I VI	Routh stability criterion	Discussion sessions	**CW**
13	4	I III	Introduction To Frequency Response	Theoretical lectures	HW
14	4	I II III VI	Root Locus Analysis	Discussion sessions	**CW**

15	4	**I II VI**	Construction Method of Bode Plot and Asymptotic.	Theoretical lectures	Exam

11.Course Evaluation	
Midterm exam:15 Assignment: 10 Lab:10 Activity: 5 Quizzes: 10 Final exam: 50.	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Automatic Control System, Farid Golnarag and Benjamin C. Kuo
Main references (sources)	• In the library, there are many control systems books that can be used as reference books.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Image processing
2. Course Code:
IMPR362
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Dr. Ayman Dhafer Abdul nafs E-mail: ayman@uomosul.edu.iq
8. Course Objectives

Course Objectives	student who finish this course should: 1) the important rule of studying the image processing and its application in the robotic system.(**I)** 2)Knowing different type of image filtering of spaicial and frequency filters. **(III)** 3) The student learned what image segmentation and image classifiacation. (**VI)** 4) the student learned the image compression. (**VII**)

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The student understand the lesson	Introduction to digital image processing	Theoretical	Class participation and quiz
2		The student understand the lesson	Digital imaging fundamentals 1	Theoretical	Class participation and quiz

3		The student understand the lesson	Digital imaging fundamentals 2	Theoretical	Class participation and quiz
4		The student understand the lesson	Image enhancement 1	Theoretical	Class participation and quiz
5		The student understand the lesson	Image enhancement 2	Theoretical	Class participation and quiz
6		The student understand the lesson	Image enhancement Histogram processing	Theoretical	Class participation and quiz
7		The student understand the lesson	Image enhancement spatial filters 1	Theoretical	Class participation and quiz
8		The student understand the lesson	Image enhancement spatial filter 2	Theoretical	Class participation and quiz
9		The student understand the lesson	Image enhancement frequency filter 1	Theoretical	Class participation and quiz
10		The student understand the lesson	Image enhancement frequency filter 2	Theoretical	Class participation and quiz
11		The student understand the lesson	Image segmentation	Theoretical	Class participation and quiz
12		The student understand the lesson	Image segmentation	Theoretical	Class participation and quiz
13		The student understand the lesson	IMAGE compression 1	Theoretical	Class participation and quiz
14		The student understand the lesson	IMAGE compression 2	Theoretical	Class participation and quiz
15			review		

11.Course Evaluation

The score is divided into the mid term exam of 25, daily exams of 10, reports, class activities and attendance of 5, and the final exam of 60, for a total of 100.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Rafael c Conzales &Richard E wood, digital image processing, 4th ed., 2010.
Main references (sources)	• various level textbooks, and workbooks

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Solid Modeling
2. Course Code:
SMOD363
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
Name: Dr. Omar W. Maaroof E-mail: omarmaaroof@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. Students will be familiar with important solid modeling representations and techniques to create 3-D solid models, and geometric modeling [II, VI, and VII] 2. Will gain engineering program experience and skills as an essential tool for the design procedure [III and VI] 3. Will gain an understanding of theoretical and practical concerns as they design, implement, and analyze samples in Solid Modeling and CAD/CAM within the designing team [II, III, and VII] 4. Will learn how to communicate effectively using graphic forms with different levels of engineers, technicians, and product developers. Students will experience self-learning techniques for any solid modeling commercial programs. [I and VI]

9. Teaching and Learning Strategies	
Strategy	1-Computer laboratories 2-Mini Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	**I, VI**	**Introduction:** Solid Modeling, some available Software	Computer laboratories	Assignment
2	3	**I, II**	**Creating Sketch Entities:** Centerlines, Sketch Command, Line Command, Exit Sketch.	Computer laboratories	Classwork
3	3	**I**	**Creating Sketch Entities:** Basic Sketching Tools.	Computer laboratories	Classwork Assignment
4	3	**I**	**Creating Sketch Entities:** Advance Sketching & Editing Tools.	Computer laboratories	Classwork Assignment Test
5	3	**I, IV**	**Applying Dimensions and Sketch Relations:** Smart Dimensioning, View Sketch Relations, constraints, Examples.	Computer laboratories	Classwork Assignment
6	3	**I**	**Solid Modeling Tools:** Creating Basic Swept Features, Extruded Boss/Base (Blind), Merge Result Option, Examples.	Computer laboratories	Test Assignment
7	3	**I**	**Solid Modeling Tools:** Extruded Cut, Extruded Cut (Through All), Examples	Computer laboratories	Classwork Assignment
8	3	**I**	**Reference Geometry and Curves:** Reference Features, Creating Reference Plane, Creating Reference	Computer laboratories	Classwork Assignment

			Axis, Reference Coordinate System		
9	3	**I, II, III**	**Components-Parts:** Physical properties, Mechanical analysis, Center of Mass, Mass Properties.	Computer laboratories	Classwork Assignment Test
10	3	**I, II**	**Hole Features and Pattern Geometry:** Creating Simple Hole, Hole Wizard, Mirror, Pattern Tools, Examples.	Computer laboratories	Classwork Assignment Test
11	3	**I, V**	**Advanced Solid Modeling Tools:** Swept Boss/Base Tool, Swept Cut Tool, Lofted tools Examples.	Computer laboratories	Classwork Assignment
12	3	**I, II, III, IV**	**Components-Assemblies:** Starting Assembly**,** mates (constraints).	Computer laboratories	Classwork Assignment
13	3	**I, III, IV, VII**	**Drawings and Views:** Drawing Sheet Selection, Creating a Drawing from any Opened Part or Assembly, Generating Bill of Material	Computer laboratories	Classwork Assignment
14	3	**I, III, IV, VI, VII**	**CAD/CAM:** Manufacturing, Rapid prototyping, 3D Printing, CNC & G-Code	Computer laboratories	Classwork Assignment Test
15	3	**I**	**Case Study:** Examples of mechanical parts design and manufacturing	Computer laboratories	Minim Project
11.Course Evaluation					

	Method (Assessments)	Marks	GOs					
			I	II	III	IV	VI	VII
Assignment & Grading	Midterm exam	20	5	5	5	5		
	Assignment	10	2	2			3	3
	Quizzes and Activities	10	6	2				2
	Mini Project	10		4	2		2	2
	Final exam	50	35	5	5	5		
Sum		100	48	18	12	10	5	7
GO %			100%	100%	100%	100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Amit Bhatt, Mark Wiley. SolidWorks 2022 Step-By-Step Guide-CAD Folks (2021)
Main references (sources)	• INTRODUCING SOLIDWORKS (SOLIDWORKS help) • Planchard, David. SOLIDWORKS 2021 Tutorial: A Step-by-Step Project Based Approach Utilizing 3D Modeling. SDC Publications, 2020.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Modeling and Simulation
2. Course Code:
MODS302
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 2
7. Course administrator's name
Name: Dr. Omar W. Maaroof E-mail: omarmaaroof@uomosul.edu.iq
8. Course Objectives

Course Objectives	On completing the course, students will be able to have the following skills: **1- Modeling and simulation problem solving**: be able to represent various Mechatronics elements in a mathematical expression. Identify the order of the system, formulate the dynamic equation, and solve problems using appropriate models and simulation tools such as the Transfer function, State-space representation, Modified analogy approach, and block diagram modeling. (I) **2- Programming and visualization**: Be able to use MATLAB or utilize other programming languages to create, modify, and visualize models and simulations. (III) (VI) **3-Application and integration**: Be able to apply modeling and simulatio concepts and techniques to real-world scenarios and case studies to desig test, optimize, and evaluate mechatronics systems. (II, VII)

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	**I**	Introduction to Modeling and Simulation	Theoretical lectures	Written test
2	**3**	**I**	Principles of Modeling and Simulation,	Theoretical lectures	Written test
3	**3**	**I**	Modeling and Simulation of Mixed Systems	Theoretical lectures Discussion sessions	Written test Assignment
4	**3**	**I, II, III**	Block Diagram Modeling	Theoretical lectures Discussion sessions	Written test Assignment
5	**3**	**I**	SISO: State-Space System Models	Theoretical lectures Discussion sessions	Written test Assignment
6	**3**	**II, III**	State-Space representations (Examples)	Theoretical lectures Laboratory experiments	Written test Assignment Laboratory task
7	**3**	**I, II, III**	Theoretical Foundations: Modeling of Dynamic Systems	Theoretical lectures Discussion sessions	Written test Assignment
8	**3**	**I**	Block Diagram Modeling (Modified Analogy Approach)	Theoretical lectures Discussion sessions	Written test Assignment
9	**3**	**I, II, III**	Block Diagram Modeling (Modified Analogy Approach)	Theoretical lectures Discussion sessions	Written test Assignment Classwork
10	**3**	**I**	Modeling Electrical systems	Theoretical lectures Laboratory experiments	Written test Assignment Laboratory task

11	**3**	**I**	Modeling Mechanical systems (Translational systems)	Theoretical lectures Laboratory experiments	Written test Assignment Laboratory task
12	**3**	**I**	Modeling Mechanical systems (Rotational systems)	Theoretical lectures Discussion sessions	Written test Assignment Classwork
13	**3**	**I, VII**	Modeling Electro-Mechanical Systems (DC Motor)	Theoretical lectures Laboratory experiments	Written test Assignment Laboratory task
14	**3**	**I**	Modeling Fluid system	Theoretical lectures Discussion sessions	Written test Assignment Classwork
15	**3**	**I**	Modeling Fluid system (incompressible fluid)	Theoretical lectures Discussion sessions	Written test Assignment Classwork

11.Course Evaluation

	Method (Assessments)	**Marks**	**GOs**				
			I	**II**	**III**	**VI**	**VII**
Assignment &Grading	Midterm exam	20	20				
	Assignment	7	2	2			3
	Quizzes	8	8				
	Laboratory works	15		2	6	5	2
	Final Lab. exam	10			10		
	Final exam	40	40				
Sum		100	70	4	16	5	5
GO %			100%	100%	100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Mechatronic Systems: Modeling and Simulation with HDL by George Pelz. 2003 • Mechatronic Systems Design by Devdas Shetty and Richard A. Kolk, 2011 • Automatic Control Systems by Golnaraghi and Kao 2010
Main references (sources)	• Karnopp, Dean C., Donald L. Margolis, and Ronald C. Rosenberg. *System dynamics: modeling, simulation, and control of mechatronic systems*. John Wiley & Sons, 2012. • Lectures will be based on several resources including books and MATLABhelp.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:

Power electronics

2. Course Code:

PELD351

3. Semester / Year:

2024 – 2023

4. Description Preparation Date:

30/3/2024

5. Available Attendance Forms:

Presence

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

4 / 3

7. Course administrator's name

1- Name:Dr.Myasar salim altar

E-mail: myasaralattar@uomosul.edu.iq

8. Course Objectives

Course Objectives	The objective of this course is to: 1. **Ability to solve engineering problems.** 2. **Ability to produce engineering designs.** 3. **Ability to create and carry out measurements and tests.** 4. **Ability to work on teams and manage projects.**

9. Teaching and Learning Strategies

Strategy	1- Theoretical lectures 2- home work 3- Assignments 4- computer lab

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	introduction to equations needed in power electronics circuit and wave analysis	Theoretical lectures	

2	2	I,II	solved problem for ac and dc ciruit analysis	Theoretical lectures	
3	2	I,II	power electronics switches diodes type operation principles and characteristics	Theoretical lectures	
4	2	I,II	power electronics switches thyristors type operation principles and characteristics	Theoretical lectures	
5	2	I, II, III	solved problem	Theoretical lectures	quiz
6	2	I,II	single phase controlled anduncontrolled rectifiers half wave	Theoretical lectures	
7	2	I, II, ,III,VII	single phase bridge un controlled rectifiers full wave	Theoretical lectures	
8	2	I,II,III	single phase bridge semicontrolled and controlled rectifiers full wave	Theoretical lectures	
9	2	I,II	mid term exam	Theoretical lectures	mid term exam
10	2	I, II, ,III,VII	single phase ac to ac half wave controlled circuit	Theoretical lectures	
11	2	I, II, III	dc-dc converter	Theoretical lectures	
12	2	I,II	buck and boost converter	Theoretical lectures	
13	2	I,II	dc-ac converter (inverter)	Theoretical lectures	quiz
14	2	I,II	dc-ac converter (inverter) resonance type	Theoretical lectures	
15	2	I, II, III			**Final Exam**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports.... etc.

	Method	NO	Weighting	GOs			
				I	II	III	VII
Assignment & Grading	Activities		5%				
	Assignment	3	5%		5		
	Quiz	2	5%	5			
	Midterm exam	1	25%	25			
	LAB	3	25%	5	5	10	5
	Final exam	3	40%	40			
Total Marks			100%	75	10	10	5
GOs %				100%	100%	100%	

12.Learning and Teaching Resources

text book	3. 1- POWER ELECTRONICS HANDBOOK , by MUHAMMAD H. RASHID 2001 2.Power Electronics Design Handbook by Nihal Kularatna 1998
Recommended books and references (scientific journals, reports...)	3-POWER ELECTRONICS HANDBOOK DEVICES, CIRCUITS, AND APPLICATIONS ,Third Edition by MUHAMMAD H. RASHID 2001
Electronic References, Websites	

1. Course Name:
Microcontroller Systems Design
2. Course Code:
MCSD353
3. Semester / Year:
2024 - 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
Name: Dr. Mohammed Yaseen E-mail: mohammed.alnuaimi@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. GO I: Problem-solving skills - This course equips students with the ability to identify, evaluate, and solve engineering problems by teaching them the internal architecture of microcontrollers and how to develop assembly language programs. This knowledge is fundamental in understanding and troubleshooting complex engineering issues related to microcontroller-based systems. 2. GO II: Design integrated systems - By learning about microcontrollers, specifically the PIC 16F84A, students gain the ability to design and integrate components and processes into functional systems. This is essential for creating solutions that meet societal needs, especially in fields that require automation and intelligent systems. 3. GO III: Conduct experiments and data analysis - The course includes laboratory work where students outline and conduct experiments with microcontrollers, enabling them to analyze and interpret data. This hands-on experience is crucial for understanding the practical aspects of microcontroller function and application. 4. GO VI: Acquiring new knowledge in mechatronics engineering - The course is designed to provide students with deep knowledge of microcontroller systems, their internal architectures, and programming. This contributes to their ability

	to learn and adapt to new technologies and knowledge areas within mechatronics engineering.

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Computer laboratories 3- Assignments 4- Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**II / III / VI**	Introduction to the microcontrollers and the difference between microprocessor and microcontroller.	1.Theoretical lectures 2.Computer laboratories	
2	4	**II / III / VI**	The RISC and CISC architectures.	1.Theoretical lectures 2.Computer laboratories	
3	4	**II / III / VI**	The Internal Architecture of the PIC microcontrollers	1.Theoretical lectures 2.Computer laboratories	
4	4	**I / II / III / VI**	The memory organisation of microcontrollers.	1.Theoretical lectures 2.Computer laboratories	**Quiz**
5	4	**II / III / VI**	The Data memory of PIC Microcontrollers.	1.Theoretical lectures 2.Computer laboratories	**Activity**
6	4	**II / III / VI**	The program memory of PIC Microcontrollers.	1.Theoretical lectures 2.Computer laboratories	
7	4	**I**	Mid-term Exam		**Midterm Exam**

8	4	**II / III / VI**	The PIC microcontroller assembly statement and instruction set.	1.Theoretical lectures 2.Computer laboratories	**Assignment**
9	4	**I / II / III / VI**	The PIC microcontroller Bit oriented instructions.	1.Theoretical lectures 2.Computer laboratories	**Quiz**
10	4	**II / III / VI**	The PIC microcontroller Byte oriented instructions.	1.Theoretical lectures 2.Computer laboratories	**Assignment**
11	4	**II / III / VI**	The PIC microcontroller arithmetic and Logic instructions.	1.Theoretical lectures 2.Computer laboratories	**Activity**
12	4	**II / III / VI**	The PIC microcontroller control instructions.	1.Theoretical lectures 2.Computer laboratories	**Activity**
13	4	**II / III / VI**	The PIC microcontroller shift and rotate instructions.	1.Theoretical lectures 2.Computer laboratories	
14	4		Course Review	1.Theoretical lectures 2.Computer laboratories	
15		**I**	Final Exam		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

Assignment & Grading	**Method**	**NO**	**Weighting**	**GOs**			
				I	**II**	**III**	**VI**
	Activities	**3**	**10%**		**3**	**3**	**4**

	Assignment	**2**	**10%**	**4**	**3**	**3**	
	Quiz	**2**	**10%**	**10**			
	Midterm exam	**1**	**10%**	**10**			
	Final Practical Exam	**1**	**10%**	**10**			
	Final exam	**1**	**50%**	**50**			
Total Marks			**100%**	**84**	**6**	**6**	**4**
GOs %				**100%**	**100%**	**100%**	

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Martin P. Bates, "Introduction to Microelectronic Systems: The PIC 16F84 Microcontroller", Butter worth-Heinemann, 2011. • The Microchip Corporation Data Sheet of PIC 16F84A Microcontroller.
Main references (sources)	• Martin P. Bates, "PIC Microcontrollers: An Introduction to Microelectronics, Elsevier Science & Technology, 2011.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Microprocessors and assembly language
2. Course Code:
MICA304
3. Semester / Year:
2024 − 2023
4. Description Preparation Date:
26/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Ali Abduljalil Abdulla E-mail: ali.alkurukchi@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to: **1- Link to GO I** Have deep understanding of microproccessor systems and its internal architectures, memory design, and IO design. This objective will achieve through the Quizzes, Midterm exam and Final exam. **2- Link to GO II & III** Gain an ability to develop an Assembly program. This objective will achieve the GOII & III through the Assignment, and Activity. **3- Link to GO III** Gain an ability to Design a complete microprocessors system which include(addressing, buffering, latching, and decoding.

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Assignement 5-Exam 6- Projects

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**I**	Introduction to the microprocessors and microcomputers	Theoretical Lectures	
2	**2**	**I**	The Microarchitectures and software model of 8086 microprocessors	Theoretical Lectures	**Homework**
3	**2**	**I**	addressing mode	Theoretical Lectures	
4	**2**	**I**	Data transfer instructions	Theoretical Lectures	**Quiz**
5	**2**	**I**	Unsigned number and their mathematics instructions	Theoretical Lectures	
6	**2**	**II,III**	Signed number and their mathematics instructions	Theoretical Lectures	**Discussion**
7	**2**	**I,III**	Mid-Term Exam		**Mid_Term Exam**
8	**2**	**I**	Control instructions	Theoretical Lectures	
9	**2**	**I**	Shift and rotate statements and instructions	Theoretical Lectures	
10	**2**	**I**	Formulation and creation of assembly Loops.	Theoretical Lectures	**Quiz**
11	**2**	**I**	The Subroutines in 8088/8086 assembly Language.	Theoretical Lectures	**Homework**
12	**2**	**II,III**	**Memory and memory interfacing**	Theoretical Lectures	**Discussion**
13	**2**	**I**	**I/O address decoding**	Theoretical Lectures	

14	**2**	**II,III**	**I/O design**	Theoretical Lectures	**Discussion**
15	**2**	**II,III**	Discussion of the student projects.		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**NO**	**Weighting**	**GOs**		
				I	**II**	**III**
Assignment & Grading	**Activities**	**3**	**5%**		**3**	**2**
	Homework	**2**	**5%**		**2**	**3**
	Quiz	**2**	**5%**	**5**		
	Mid-Term Exam	**1**	**20%**	**15**		**5**
	Lab.	**15**	**15%**	**5**		**10**
	Final Exam	**1**	**50%**	**40**		**10**
Total Marks			**100%**	**80**	**14**	**6**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Walter A. Triebel, Avtar Singh, "The 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications", Fourth Edition, Pearson Education Ltd, 2014.
Main references (sources)	• W. Triebel, A. Singh, "The 8088 and 8086 Microprocessors", Fourth Edition, Pearson Education Ltd, 2018.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description / Fourth level

1. Course Name:
Modern Control Systems
2. Course Code:
MOCS402
3. Semester / Year:
2024 − 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Firas Ahmed Al-Durze E-mail: dr.firasaldurze@uomosul.edu.iq
8. Course Objectives

Course Objectives	Understanding the various issues related to digital control systems such as 1. Students understand the basic sampling theory and converter [I] 2. Students understand Z-transform and its properties [I] 3. Students can analyze signals in both time domain and Z domain [I II] 4. Students understand transfer function, block diagram, and signal flow graphs [I] 5. Students understand the state variable technique [I] 6. Students understand the basic knowledge necessary for system stability [I VI] 7. Students learn the theory of digital PID controller [I II III VI] 8. Students can design the discrete-date control systems [I II III VI]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	I	Introduction to digital control.	Theoretical lectures	**HW**
2	4	I	Discrete time system representation.	Theoretical lectures	**HW**
3	4	I	Mathematical modeling of sampling process.	Theoretical lectures	**HW**
4	4	I	Data reconstruction.	Theoretical lectures	**HW**
5	4	III	Modeling discrete-time systems by pulse transfer function.	Theoretical lectures	**HW**
6	4	I	Revisiting Z-transform.	Theoretical lectures	**Exam**
7	4	III	Mapping of s-plane to z-plane.	Discussion sessions	**CW**
8	4	I	Pulse transfer function I.	Theoretical lectures	**HW**
9	4	I	Pulse transfer function II.	Theoretical lectures	**Exam**
10	4	III	Sampled signal flow graph.	Theoretical lectures	**HW**
11	4	I III	Stability analysis of discrete time systems.	Theoretical lectures	**HW**
12	4	I III	Jury stability test. Stability analysis using bi-linear transformation	Discussion sessions	**CW**
13	4	I III	Time response of discrete systems.	Theoretical lectures	**HW**
14	4	I II III VI	Transient and steady state responses	Theoretical lectures	**Exam**
15	4	I II III VI	Root locus method for discrete system.	Discussion sessions	**CW**
11.Course Evaluation					
Midterm exam:15 Assignment: 10 Lab:10 Activity: 5 Quizzes: 10 Final exam: 50					
12.Learning and Teaching Resources					

Required textbooks (curricular books, if any)	• Digital Control Engineering Analysis and Design, M. Sami Fadali, Second Edition.
Main references (sources)	• In the library, there are many control systems books that can be used as reference books.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Industrial automation
2. Course Code:
INAU451
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Ali A. Abdulla Alkurukchi E-mail: ali.alkurukchi@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to: **1- Link to GO I** Have deep understanding of Automation systems and its types. This objective will achieve through the Quizzes, Midterm exam and Final exam. **2- Link to GO II & III** Gain an ability to develop a PLC program using various Programming methods. This objective will achieve the GOII & III through the Assignment, and Activity. **3- Link to GO III** Design a complete Mechatronic System.

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Assignement 5-Exam 6- Projects
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**I**	Introduction, the major advantages of using automation, Automation Lab. Example, Industrial Automation vs. Industrial Information Technology,	Theoretical Lectures	
2	**2**	**II,III**	Role of automation in industry, Automation Advantages, Industrial Product Life Cycle, Economy of Scale and Economy of Scope, Production Systems Types, Types of Automation Systems	Theoretical Lectures	**Homework**
3	**2**	**I**	Architecture of Industrial Automation Systems, The Functional Elements of Industrial Automation, Sensing and Actuation Elements.	Theoretical Lectures	
4	**2**	**II,III**	Industrial Sensors and Instrument Systems. Industrial Actuator Systems, Industrial Control Systems, The Architecture of Elements: The Automation Pyramid	Theoretical Lectures	**Discussion**
5	**2**	**II,III**	Introduction to Sequence/Logic Control and Programmable Logic Controllers, Industrial Example of Discrete Sensors	Theoretical Lectures	**Homework**

			and Actuators, Programmable Logic Controllers (PLC),		
6	**2**	**I**	Comparing Logic and Sequence Control with Analog Control, PLC Evolution , PLC >> Application Areas, PLCs Architecture, Communications processors, Expansion units, Input/output Units, Programmers	Theoretical Lectures	**Quiz**
7	**2**	**I,III**	Mid-Term Exam	Theoretical Lectures	**Mid_Term Exam**
8	**2**	**I**	The Software Environment and Programming of PLCs, Structure of a PLC Program, The cyclic execution of PLC Programs,	Theoretical Lectures	
9	**2**	**I**	The Relay Ladder Logic (RLL) Diagram, Example: Forward Reverse Control	Theoretical Lectures	
10	**2**	**I**	The Function Chart (IEC), The Statement List (STL), Typical Operands of PLC Programs, Internal Variable Operands or Flags,	Theoretical Lectures	**Quiz**
11	**2**	**II,III**	Timers(On delay, Off delay, Fixed pulse width timer, Retentive Timer, Non-Retentive Timer), Counter, User defined Data, Addressing, Operation Set.	Theoretical Lectures	**Discussion**

12	**2**	**I**	Formal Modelling of Sequence Control Specifications and Structured RLL Programming, motivation example Industrial stamping process,	Theoretical Lectures	
13	**2**	**I**	Steps in Sequence Control Design, Design of RLL Program, state transition logic, state logic, output logic,	Theoretical Lectures	
14	**2**	**I**	Introduction to Computer Numerically Controlled (CNC) Machines	Theoretical Lectures	
15	**2**	**II,III**	G-Codes Principals	Theoretical Lectures	**Discussion**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	**NO**	**Weighting**	**GOs**		
				I	**II**	**III**
Assignment & Grading	**Activities**	**3**	**5%**		**3**	**2**
	Assignment	**2**	**5%**		**2**	**3**
	Quiz	**2**	**5%**	**5**		
	Midterm exam	**1**	**20%**	**15**		**5**
	Lab. work	**15**	**15%**	**5**		**10**
	Final exam	**1**	**50%**	**40**		**10**
Total Marks			**100%**	**80**	**14**	**6**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• M. Groover, "Automation, Production Systems, and Computer Integrated Manufacturing" 3rd edition.
Main references (sources)	• In the library, there are many Automations books that can be used as reference books

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Design of Machine Elements II
2. Course Code:
DMEL401
3. Semester / Year:
2024 − 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
1- Name: Mr. Ahmad Wadollah S. Al-Sabawi E-mail: ahmadalsabawi@uomosul.edu.iq
8. Course Objectives

Course Objectives	**1. Link to GO I, II and VI** At the end of the course, student must be able to: Understand basic concepts of machine design and analysis. **2. Link to GO III and IV** Gain a basic idea about the available engineering analysis packages. Get a basic method for analysis of any mechanical device. Learn and gain engineering morals and ethics.

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Discussion sessions 3- Projects and class activities.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	**I, II, III, V and VI**	Kinematics of Gears	Lectures	
2	**3**	**I, II, III, V and VI**	Spur Gear Design	Lectures	**hw**
3	**3**	**I, II, III, V and VI**	Rolling Contact Bearings 1	Lectures	**quiz**

4	3	I, II, III, V and VI	Rolling Contact Bearings 2	Lectures	
5	3	I, II, III, V and VI	Plain Surface Bearings	Lectures	**hw**
6	3	I, II, III, V and VI	Springs	Lectures	**quiz**
7	3	I, II, III, V and VI	Clutches and Brakes	Lectures	
8	3	I, II, III, V and VI	Midterm Exam	Lectures	**Midterm exam**
9	3	I, II, III, V and VI	Fasteners	Lectures	
10	3	I, II, III, V and VI	Machine Frames, Bolted Connections and Welded Joints 1	Lectures	**hw**
11	3	I, II, III, V and VI	Machine Frames, Bolted Connections and Welded Joints 2	Lectures	**quiz**
12	3	I, II, III, V and VI	Electric Motors and Controls	Lectures	
13	3	I, II, III, V and VI	Linear Motion Elements 1	Lectures	**hw**
14	3	I, II, III, V and VI	Linear Motion Elements 2	Lectures	
15	3	I, II, III, V and VI	Final Exam		Final exam

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs		
				I	II	VII
Assignment & Grading	**Class Activities**	**1**	**5%**		**3**	**2**
	Assignment	**3**	**3%**		**2**	**1**
	Quiz	**3**	**12%**	**12**		
	Project	**1**	**5%**	**5**		
	Midterm exam	**1**	**15%**	**15**		
	Final exam	**1**	**60%**	**60**		
Total Marks			**100%**	**92**	**5**	**3**
GOs %				**100%**	**100%**	**100%**

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Machine Elements in Mechanical Design, Robert L. Mott, 6th Ed. 2008.

Main references (sources)	• Shigley's Mechanical Engineering Design, Budynas and Nisbett, 8th, 2006.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://ocw.mit.edu/courses/2-72-elements-of-mechanical-design-spring-2009/

1. Course Name:	
Engineering Management	
2. Course Code:	
NGC425	
3. Semester / Year:	
2024 – 2023	
4. Description Preparation Date:	
30/3/2024	
5. Available Attendance Forms:	
Presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 / 2	
7. Course administrator's name	
1- Name: Dr. Mohammed Falah Mohammed E-mail: mohammed.falah_kanna@oomosul.edu.iq	
8. Course Objectives	
Course Objectives	The objective of this course is to: **1. Knowledge (Link to GO I)** Gain a comprehensive understanding of engineering management concepts, project feasibility assessments, and principles of production organization. Recognize the significance of controlling and managing risks, costs, schedules, and resources in project management. Assessment will be conducted through assignment, quizzes, midterm, and final examinations to achieve GO I. **2. Knowledge (Link to GO: II)** Apply various operational research techniques, such as linear programming, graphical methods, and algebraic methods, to effectively design and optimize integrated systems within industrial enterprises. Practical application of these techniques will be emphasized through assignments and activities to fulfill GO II. **3. Skills (Link to GO: VII)** Develop proficiency in collaborative teamwork within diverse, multidisciplinary teams to analyze and resolve engineering management challenges while meeting the assessments deadlines. Assessment will be conducted through Assignments and Activities to achieve GO VII.
9. Teaching and Learning Strategies	
Strategy	1- Theoretical lectures 2- Discussion sessions

	3- Assignments 4- Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I**	Concepts and objectives of Engineering Management		
2	2	**I**	Technical and economic studies for project feasibility.	Theoretical lectures	
3	2	**I**	Plant performance appraisal.	Theoretical lectures	
4	2	**I**	Administrative and production organization of industrial enterprises	Theoretical lectures	**Quiz**
5	2	**I, II, VII**	Using operation research in production.	Theoretical lectures	**Activity**
6	2	**I**	Midterm Exam		**Midterm Exam**
7	2	**I, II, VII**	Linear programming and Graphical method.	Theoretical lectures	**Assignment**
8	2	**I**	Algebraic method and Simplex method	Theoretical lectures	**Quiz**
9	2	**I, II, VII**	Allocation of resources.	Theoretical lectures	**Assignment**
10	2	**I, II, VII**	Quality Control and production inspection method.	Theoretical lectures	**Activity**
11	2	**I**	Industrial costs and controllable cost techniques.	Theoretical lectures	
12	2	**I**	Time measurement studies for production operations.	Theoretical lectures	

13	2	I	Method Time studies for production operations.	Theoretical lectures	
14	2	I	Productivity, measurement method, and techniques.	Theoretical lectures	
15	2	I	Review		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs		
				I	II	VII
Assignment & Grading	Activities	2	10%		7	3
	Assignment	2	10%	3	5	2
	Quiz	2	10%	10		
	Midterm exam	1	10%	10		
	Final exam	1	60%	60		
Total Marks			100%	83	12	5
GOs %				100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• د. عادل عبد المالك " الهندسة الصناعية "– دار الكتب للطباعة والنشر - جامعة البصرة - الطبعة الأولى 2000 • د. خليل العاني ، د. إسماعيل إبراهيم القزاز ، د. عادل عبد المالك آوريال " إدارة الجودة الشاملة ومتطلبات الأيزو 2000:9001 " الأشقر- بغداد الطبعة الأولى 2001 ، مطبعة . • Hamdy A. Taha " Operations Research: an introduction" 6th edition (1997), Prentice-Hall. • Prem Kumar Gupta and D.S. Hira " Operations Research: an introduction" 2nd edition (1989) S. Chand & Company LTD, New Delhi. • Charles E. Ebeling "An Introduction to Reliability and Maintainability Engineering " (1997), McGraw-Hill.
Main references (sources)	• د. مازن بكر عادل وأخرون " بحوث العمليات للإدارة الهندسية " جامعة الموصل 1986

	• Phillips,D.T.;Ravindran,A.;Solberg ,J." Operations Research : Principles and Practice " (1976) John Wiley
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Intelligent control
2. Course Code:
ICON464
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
3 / 3
7. Course administrator's name
1- Name: Dr. Mohammed Falah Mohammed Kanna E-mail: mohammed.falah_kanna@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objective of this course is to: **1. Knowledge (Link to GO I)** Analyze and comprehend the advantages and drawbacks of intelligent controllers. Understand when to apply intelligent controllers and how to derive, develop, and apply them. This outcome will be assessed through the Quizzes, Midterm exam and Final exam. **2. Knowledge (Link to GO: II)** Comprehend advanced mathematical models and intelligent systems and design intelligent systems for various applications. This outcome will be assessed through the Assignment, Activity, and Mini Project. **3. Skills (Link to GO: III)** Execute experiments proficiently, analyze data accurately, and interpret results effectively to enhance decision-making in the field of intelligent control. The Mini Project will involve hands-on experiments, data analysis, and interpretation, ensuring students develop practical skills in experimenting with intelligent control concepts. **4. Skills (Link to GO: VII)** Collaborate effectively in multi-disciplinary teams to analyze, solve problems, and meet project deadlines in the context of intelligent control systems. Activities and Mini Project will require students to work collaboratively on problem-solving tasks, emphasizing teamwork and project deadlines as essential transferrable skills.

9. Teaching and Learning Strategies

Strategy	1. Theoretical lectures 2. Discussion sessions (Activities) 3. Mini Project 4. Exam and Quizzes 5. Assignments

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**3**	**I**	An introduction to classical and intelligent control systems.	Lecture	
2	**3**	**I, VII**	Intelligent systems and applied artificial intelligence.	Lecture	**Activity**
3	**3**	**I**	Intelligent control concepts.	Lecture	
4	**3**	**I**	Introduction to fuzzy logic.	Lecture	
5	**3**	**I**	Fuzzy Logic, and Fuzzy Set	Lecture	**Quiz**
6	**3**	**I, II**	Fuzzy Logic, Membership Functions, and Standard Fuzzy Systems (SFS)	Lecture	**Assignment**
7	**3**	**I, II, VII**	Foundation of Fuzzy Mathematics	Lecture	**Activity**
8		**I**	**Midterm Exam**		**Midterm Exam**
9	**3**	**I, III, VII**	Fuzzy logic control and application	Lecture	**Project**
10	**3**	**I**	Fuzzy Neural Network – theory, design, and defuzzification	Lecture	**Quiz**
11	**3**	**I, II, III, VII**	Intelligent control systems: research paper analysis	Lecture	**Project**
12	**3**	**I, VII**	Artificial neural networks: fundamentals and architectures	Lecture	**Assignment**
13	**3**	**I, II, VII**	Artificial neural networks: applications.	Lecture	**Activity**

14	**3**	**I**	Optimization of intelligent systems using GA	Lecture	
15		**I, II, III, VII**	Projects discussion.		**Project evaluation**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method (Assessments)	**No.**	**Weightings**	**GOs**			
				I	**II**	**III**	**VII**
Assignment & Grading	Midterm exam	1	10%	10			
	Mini Project	1	10%	2	2	4	2
	Assignment	2	5%	2	3		
	Activity	3	5%		3		2
	Quizzes	2	10%	10			
	Final exam		60%	60			
Sum			100%	84	8	4	4
GOs %				100%	100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Zilouchian, Ali, and Mo Jamshidi, eds. Intelligent control systems using soft computing methodologies. CRC press, 2001.
Main references (sources)	• Liu, Jinkun. Intelligent control design and MATLAB simulation. Singapore: Springer, 2018.
Recommended books and references (scientific journals, reports...)	• Al Sayaydeh O. N., Mohammed M. F., Alhroob E., Tao H. & Lim C. P (2019), "A Refined Fuzzy Min-MaxNeural Network with New Learning Procedures for Pattern Classification," *IEEE Transactions on Fuzzy Systems*, pp. 1-14. • Mohammed M. F., & Lim C. P. (2015). "An Enhanced Fuzzy Min-Max Neural Network for Pattern Classification." *IEEE Transactions on Neural Networks and Learning Systems*, vol.26, no.3, pp.417-429.
Electronic References, Websites	

1. Course Name:
Robotics
2. Course Code:
ROTI400
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Saad Zaghlul Saeed E-mail: saeeds70@uomosul.edu.iq 2- Name: Zead Mohammed Yosif E-mail: Zmyousif@uomosul.edu.iq
8. Course Objectives

Course Objectives	1)Student is able to understand the transformation of position, velocity and acceleration. [I, II, VII] 2)Student is able to calculate the forewords and inverse kinematics. [I, II, III, VI] 3)Student is able to understand the velocity propagation from link to another towords the tip. [I, II, III] 4)Student is able to obtain the dynamic equations of any robot arm. [I, II, III] 5)Understand the generation of trajectory for robot arm.[I, II, VI] 6)Student is able to design a controller for trajectory tracking. [I, II, III]

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions 3-Laboratory experiments 4-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Introduction to robotics: Types of joints used in robots Mechanisms, Descriptions (position, orientations, and frames).	Theoretical lectures	home works
2	2	I, II, III, VI	Link properties: Link-connection description, Derivation of link transformations.	Laboratory experiments	Lab reports
3	2	II	MANIPULATOR KINEMATICS.	Discussion sessions	term exam
4	2	I, II, VI	EXAMPLE: KINEMATICS OF INDUSTRIAL ROBOT.	Projects	Project
5	2	II	Joint's angle: Inverse kinematics of serial robots.	Theoretical lectures	term exam
6	2	I	LINEAR AND ROTATIONAL VELOCITY OF RIGID BODIES	Theoretical lectures	Quizzes
7	2	II	Velocity propagation from link to link.	Theoretical lectures	Quizzes
8	2	I, II	Mid Term Exam		
9	2		JACOBIANS: SINGULARITIES Forces: Static force in manipulators.	Discussion sessions	
10	2	II	Dynamics: NEWTON'S EQUATION, EULER'S EQUATION, Iterative Newton-Euler dynamic formulation.	Theoretical lectures	Quizzes
11	2	II I	Dynamics: AN EXAMPLE OF CLOSED-FORM DYNAMIC EQUATIONS, THE STRUCTURE OF A MANIPULATOR'S DYNAMIC EQUATIONS	Theoretical lectures	home works
12	2	I	Trajectory generation: Cubic polynomials.	Theoretical lectures	home works
13	3	III	Trajectory generation: Linear segment with parabolic bade (LSPB).	Laboratory experiments	Lab reports
14	2	I	Linear Control of manipulator: FEEDBACK AND CLOSED-LOOP CONTROL, SECOND-ORDER LINEAR SYSTEMS.	Theoretical lectures	home works
15	2	I			

11.Course Evaluation

	i	ii	iii	vi	Sum

Quizzes	2	3			5
home works	1	2			3
Project	2	6			8
term exam	14	5			19
Lab reports	0	2	2	1	5
Lab term exam		4	6		10
final exam	16	24	10		50
Total	35	46	18	1	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Introduction to robotics mechanics and control, John J. Craig, SI. Units. Third ed., 2005. • Robotics - Modelling, Planning and Control, Bruno Siciliano • Lorenzo Sciavicco • Luigi Villani • Giuseppe Oriolo, 2009.
Main references (sources)	• Kunz, T. and Stilman, M. (2011). Turning paths into trajectories using parabolic blends. GT-GOLEM-2011-006. Georgia Institute of Technology. • Q.-S. Lin, Y.-F. Yao, and J.-X. Wang, "Simulation and application of neural network PID auto-tuning controller in servo-system", IEEE 2nd International Workshop on Database Technology and Applications, 2010, pp.1-4.
Recommended books and references (scientific journals, reports...)	International Journal of Advanced Robotic Systems
Electronic References, Websites	http://www.digitallibrary.edu.pk/Index.php

1. Course Name:
Special Topics in Mechatronics
2. Course Code:
STME461
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Rafid Ahmed Khalil Alamori E-mail: rafidahmedkhalil@uomosul.edu.iq
8. Course Objectives

Course Objectives	The students who successfully fulfill the course requirements will: 1)Have the ability read and write articles and scientific researches, **I, II, III, V, VI, VII** 2)Have experience about major field in mechatronics. **I, II, V, VI** 3)Have an ability to acquire the information and presented it. **I, II, III, V, VI**

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Discussion sessions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**I, II**	Nanotechnology systems and applications	Theoretical lectures	
2	2	**I, II**	Embedded systems design and applications	Theoretical lectures	

3	2	**IV, VI**	Electric Cars	Discussion sessions	**CW**
4	2	**IV, VI**	Wind energy systems design and applications	Discussion sessions	**CW**
5	2	**I, II**	Solar energy systems design and applications	Theoretical lectures	**Exam**
6	2	**III, VII**	SCADA Systems	Theoretical lectures	
7	2	**IV, VI**	Autotronics Engineering	Discussion sessions	
8	2	**IV, VI**	Intelligent systems design and applications	Discussion sessions	**CW**
9	2	**IV, VI**	Internet of Things (IOT)	Discussion sessions	**HW**
10	2	**IV, VI**	Cooling Electronics equipments	Discussion sessions	**HW**
11	2	**III,VII**	reconfigurable robot	Theoretical lectures	**CW**
12	2	**III,VII**	Gas power Plants	Theoretical lectures	
13	2	**IV, VI**	Writing Technical and Scientific Reports	Discussion sessions	**CW**
14	2	**IV, VI**	Cooling system in airplane	Discussion sessions	
15	2	**I, II,IV, VI, VII**	Final Report discussion	Discussion sessions	**Exam**

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• W. Bolton, "Mechatronics", 6th Edition, Pearson Education Limited, 2016.
Main references (sources)	• Well known Scientific Website about the Topics.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
English Language Upper Intermediate
2. Course Code:
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
2 / 2
7. Course administrator's name
1- Name: Dr. Mohammed Yaseen Al-Nuaimi E-mail: mohammed.yaseen@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. GO (IV). An ability to communicate effectively using oral, written, and graphic forms with different levels of audiences: This is the most directly related outcome. The English course aims to develop students' skills in reading, writing, listening, and speaking in English, which is crucial for effective communication in a global engineering context. The course's emphasis on forming basic sentences and using them in real-life situations helps students convey their ideas clearly and interact with a broader audience. 2. GO (V). An understanding of the responsibility of engineers to practice professionally and ethically at all times: While this outcome is more broadly related to professional conduct, the ability to communicate effectively and understand content in English can also contribute to ethical practice. For instance, understanding international standards, guidelines, and engineering literature in English can foster better adherence to global ethical norms. 3. GO (VI). An ability to acquire new engineering knowledge and skills in the mechatronics engineering fields: Proficiency in English is vital for engineers, as it allows them to access a vast array of engineering resources, research, and

	developments published in English. This enhances their capability to acquire new knowledge and stay updated with advancements in their field.

9. Teaching and Learning Strategies

Strategy	• Theoretical lectures • Discussion sessions • Assignments • Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	IV/V/VI	Chapter one Home and away	Theoretical lectures	
2	2	IV/V/VI	Academicwriting	Theoretical lectures	
3	2	IV/V/VI	Tutorial	Discussion	Discussion
4	2	IV/V/VI	Chapter two Been there, got the T-shirt	Theoretical lectures	
5	2	IV/V/VI	Chapter three News and views	Theoretical lectures	
6	2	IV	Mid exam		Assignment
7	2	IV/V/VI	Academic writing	Theoretical lectures	Quiz
8	2	IV/V/VI	Chapter Four The naked truth	Theoretical lectures	Assignment
9	2	IV/V/VI	Academicwriting	Theoretical lectures	Quiz
10	2	IV/V/VI	Tutorial	Discussion	Discussion
11	2	IV/V/VI	Chapter Five Looking ahead	Theoretical lectures	
12	2	IV/V/VI	Tutorial	Discussion	Discussion
13	2	IV/V/VI	Chapter six Hitting the big time	Theoretical lectures	

14	2	IV/V/VI	General Review	Theoretical lectures	
15	2	IV	Final Exam		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs		
				IV	V	VI
Assignment & Grading	Activities	3	10%	4	3	3
	Assignment	2	10%	5	2	3
	Quiz	2	10%	10		
	Midterm exam	1	10%	10		
	Final exam	1	60%	60		
Total Marks			100%	89	5	6
GOs %				100%	100%	100%

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• New Headway -Upper Intermediate/ Student's Book • New Headway -Upper Intermediate/ Workbook
Main references (sources)	• Archived lectures by specialist teacher for every paper or video material
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Mechatronics System Design
2. Course Code:
MTSD450
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
30/3/2024
5. Available Attendance Forms:
Presence
6. Number of Credit Hours (Total) / Number of Units (Total)
4 / 3
7. Course administrator's name
1- Name: Dr. Saad Ahmed Salih Al Kazzaz E-mail: kazzazs60@uomosul.edu.iq
8. Course Objectives

Course Objectives	The students after successfully complete the course are able to: 1-Learn how to work with different components of mechatronics systems. (I,II,III,VI) 2-Discuss the concepts modeling as parts of control system field. (I,II,III) 3-Design and Model Parts or Whole Mechatronic System (I,II,III,VI)

9. Teaching and Learning Strategies	
Strategy	1-Theoretical lectures 2-Laboratory experiments 3-Project 4-Projects

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**I**	Mechatronics Design Process	lecture	

2	**2**	**I**	Transfer Functions, Block Diagrams and Manipulations	lecture	homework
3	**2**	**I**	Modeling and Simulation	lecture	
4	**2**	**I**	Block Diagram Modeling—Direct Method	lecture	Quiz
5	**2**	**I**	Block Diagram Modeling— Analogy and Modified Analogy Approachs	lecture	
6	**2**	**I**	Block Diagram Modeling of Electrical and Mechanical Systems	lecture	homework
7	**2**	**I**	Block Diagram Modeling Electromechanical system	lecture	Quiz
8	**2**	**I, II**	Sensors and transducers Modeling	lecture	
9	**1**	**I**	Midterm Exam		Exam
10	**2**	**I**	Modeling of Actuating systems	lecture	
11	**2**	**I**	Control system Modeling	lecture	homework
12	**2**	**I, II, VI**	Study Case I	lecture	
13	**2**	**I, II, VI**	Study Case II	lecture	Quiz
14	**2**	**I, II, VI**	Projects Discussion		
15	3	I	Final Exam		Exam
Laboratory					
Weeks	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	Lecture	Review of Modeling softwares	I	

2	2	Lab Experiment	Inroduction to MATLAB Simulink	III	Report
3	2	Lab Experiment	Modeling and Simulation using MATLAB	III	Report
4	2	Lab Experiment	Modeling and simulation Electrical Systems	III	Report
5	2	Lab Experiment	Modeling and simulation of Mechanical Systems	III	Report
6	2	Lab Experiment	Mathematical Modeling of a DC motor in Simulink	III	Report
7	2	Lab Experiment	Physical Modeling of a DC motor in Simulink Using Simscape	III	Report
8	2	Lab Experiment	Modeling of a Mechanism Using Simscape Multibody	III	Report
9	2	Exam	Midterm Exam	I	Report
10	2	Lab Experiment	Modeling and Analyzing of a Simple Pendulum Using Simscape Multibody	III	Report
11	2	Lab Experiment	Import CAD Model into Simscape Multibody	III	Report
12	2	Lab Experiment	Gathering sensor data using data acquisition card in different modes	III	Report
13	2	Lab Experiment	Discussion of Mini Projects	III	Report
14	2	Lab Experiment	Free lab for students' practices and report discussion	III	Report
15			Final Lab Exam		Exam

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc.

	Method	NO	Weighting	GOs			
				I	II	III	VI
Assignment & Grading	Quizzes	3	6%	6			
	Homework	3	6%	3	3		
	Lab Reports	8	8%	4		4	
	project	1	3%		2		1
	Lab Term Exam	1	7%	2		5	
	Midterm Exam	1	20%	12	8		
	Final Exam	1	50%	50			
Total Marks			100%	77	13	9	1
GOs %			%100	%100	%100	%100	%100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Mechatronics System Design", Second Edition, SI by Devdas Shetty and Richard A. Kolk, 2010.
Main references (sources)	• "Mechatronic Systems Design Methods, Models, Concepts", First eddition By Klaus Janschek,2012 • "Control of Mechatronic Systems: Model-Driven Design and Implementation Guidelines", First edition, by Patrick O. J. Kaltjob, 2020
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	