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: **Semesters**

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				
College Requirements				
Department Requirements				
Summer Training				
Other				

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	**practical**
Second	MTE 201	Engineering Mathematics I	**4**	
	MTE 202	Fluid Mechanics I	**3**	
	MTE 203	Thermodynamics	**3**	
	MTE 204	Mechanics of Materials	**3**	
	MTE 205	Statistics	**2**	
	MTE 206	Electronics Principles and Devices I	**2**	**2**
	MTE 207	Electrical Machines	**3**	**2**
	MTE 208	Engineering Mechanics(Dynamics)	**3**	
	MTE 210	Engineering Mathematics II	**4**	
	MTE 211	Fluid Mechanics II	**2**	**2**
	MTE 212	Heat Transfer	**2**	
	MTE 213	Engineering Economics	**2**	
	MTE 214	Electronics Principles and Devices II	**3**	**2**

	MTE 215	Electromechanical system	**2**	**2**
	MTE 216	Digital Logic	**3**	**2**
	MTE 217	Mechanical Engineering Laboratory		**2**
		English pre-intermediate	**2**	

8. Expected learning outcomes of the program

Knowledge	
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
Second	MTE 201	Engineering Mathematics I	Basic	X		X		X		
	MTE 202	Fluid Mechanics I	Basic	X	X			X		
	MTE 203	Thermodynamics	Basic	X	X			X		
	MTE 204	Mechanics of Materials	Basic							
	MTE 205	Statistics	Basic	X		X		X		
	MTE 206	Electronics Principles and Devices I	Basic	X	X	X			X	
	MTE 207	Electrical Machines	Basic	X	X	X			X	
	MTE 208	Engineering Mechanics(Dynamics)	Basic							
	MTE 210	Engineering Mathematics II	Basic	X				X	X	
	MTE 211	Fluid Mechanics II	Basic	X	X			X		

	MTE 212	Heat Transfer	Basic	X	X			X		
	MTE 213	Engineering Economics	optional	X	X					X
	MTE 214	Electronics Principles and Devices II	Basic	X	X	X		X		
	MTE 215	Electromechanical system	Basic	X	X	X			X	
	MTE 216	Digital Logic	Basic	X	X	X		X	X	
	MTE 217	Mechanical Engineering Laboratory	Basic	X		X	X		X	
		English pre-intermediate	Basic	X			X		X	

Course Description / Second stage

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 moto 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	Theoretical lectures	

			motor voltage control		
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:
Engineering Economics
2. Course Code:
MTE 213
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: Mamoon Ammar Omar E-mail: mamoonatrakchii@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:

MTE 205

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: Mamoon Ammar Omar
E-mail: mamoonatrakchii@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:

ELECTROMECHANICAL SYSTEM

2. Course Code:

MTE215

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.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:	
Engineering Mathematics I	
2. Course Code:	
MTE201	
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: Hassan M. Al-Siraj E-mail: saeedh81@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	**4**	**I**	Limits and continuity , Partial derivatives (definitions, functions of more than two variables), second and higher order partial derivatives.	**1+2+3**	**HW**
2	**4**	**I**	Chain rule for functions of two or three variables , Maxima and minima and saddle points.	**1+2+3**	**HW + Quiz**
3	**4**	**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	**4**	**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	**4**	**I, VI**	Complex analysis: Rational functions, Logarithmic functions, Exponential functions.	**1+2+3**	**HW**
6	**4**	**I, VI**	Complex analysis: Trigonometric and hyperbolic functions, General power of complex variables.	**1+2+3**	**HW**
7	**4**	**I, VI**	Complex analysis: Integration along a line	**1+2**	**HW + Quiz**
8	**4**	**I, III**	Fourier Series: even and odd function , Half Wave Symmetry, periodic functions, definition of Fourier series, Trigonometric form	**1+2+3**	**HW**
9	**4**	**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	**4**	**I, VI**	Fourier Series: introduction to Fourier Transforms	**1+2+3**	**HW**
11	**4**	**I, VI**	Fourier Series: Fourier Transforms	**1+2+3**	**HW + Quiz**

12	**4**	**I, III**	Introduction to Vector Analysis: definition, notation, properties, Vector algebra: addition, subtraction, multiplications	**1+2**	**HW**
13	**4**	**I, III**	Introduction to Vector Analysis: vector algebra (continue) with applications	**1+2**	**HW**
14	**4**	**I, III**	Introduction to Vector Analysis: Vectors and Geometry, equation of line, plane, curve parameterization with geometric applications.	**1+2**	**HW**
15	**4**	**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:
MTE210
3. Semester / Year:
Spring / 2024
4. Description Preparation Date:
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: Hassan M. Al-Siraj Email : saeedh81@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, 1st-shifting theorem (Translation in S-domain).	**1+2+3**	**HW + CW + midterm**

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:
Mechanical Engineering Laboratory
2. Course Code:
MTE217
3. Semester / Year:
2024 – 2023
4. Description Preparation Date:
2/4/2024
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 objective 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:
English Language Pre-Intermediate
2. Course Code:
3. Semester / Year:
2023-2024
4. Description Preparation Date:
4-4-2024
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 are:** 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 present perfect. This competency will be assessed through the Midterm Exam, Quizzes, HomeWorks, ClassWorks, and Final Exam 2. **Linked to GO IV** An ability to write academic reports and perform presentation related to various topics of research interests related to education, on-line learning, management, entrepreneurship in business, learning theories, learning strategies This competency will be assessed through the report of academic research. 3. **Linked to GO VII** Function effectively on multi-disciplinary teams to analyse data, make writing plans and meet deadlines within the context of English language. This competency will be assessed through the group work of academic research.

9. Teaching and Learning Strategies

Strategy	Theoretical lectures Discussions HomeWorks and ClassWorks Exams Researches and Presentations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Chapter one (tenses) Getting to know you	Theoretical Lecture	**H.W**
2	2	I	Chapter one (tenses) Getting to know you	Theoretical Lecture	
3	2	I	Chapter two (Present tenses) Whatever makes you happy	Theoretical Lecture	**H.W**
4	2	I,VII	Chapter two (Present tenses) Whatever makes you happy	Theoretical Lecture	**H.W** **Quiz** **C.W**
5	2	I	Chapter three (Past tenses) What's in the news?	Theoretical Lecture	**H.W**
6	2	I	Chapter three (Past tenses) What's in the news?	Theoretical Lecture	**H.W** **C.W**
7	2	I	Chapter four (Quantity) Eat, drink, and be merry!	Theoretical Lecture	**H.W** **C.W**
8	2	I	Chapter four (Quantity) Eat, drink, and be merry!	Theoretical Lecture	**H.W** **C.W**
9	2	I	Chapter five (Verb pattern, Future form) Looking forward	Theoretical Lecture	**H.W**
10	2	I	Chapter five (Verb pattern, Future form) Looking forward	Theoretical Lecture	
11	2	I	Mid-Term Exam		**Exam**
12	2	I	Chapter six (Comparitive and Superlative Adjectives) The way I see it	Theoretical Lecture	
13	2	I	Chapter six (Comparitive and Superlative Adjectives) The way I see it	Theoretical Lecture	**H.W** Quiz
14	2	I	Academic Writing	Theoretical Lecture	

15	2	**I, IV, VII**	Research and Presentation	**Research**	**Report and Presentation**

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**	**VII**
Assignment & Grading	Midterm exam	1	20	20		
	HomeWorks	8	3	3		
	Quizzes	2	5	5		
	Activities (Individual and Group Classwork's)	4	4	1		3
	Research/presentation	1	8	1	4	3
	Final exam	1	60	60		
Sum			100	90	4	6
GO%			100	100	100	100

12.Learning and Teaching Resources

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

1. Course Name:
Electronics principles and devices I
2. Course Code:
MTE206
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. Omar Saadallah E-mail: omar.abdulwahid@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 to Semiconductor Diodes, pn junction diode .	Theoretical Lectures	Quiz
2	**2**	**I**	Diode types , Load-Line analysis ; series, parallel, and series-parallel diode networks.	Theoretical Lectures	H.W and Quiz
3	**2**	**I, II**	Diode Applications,clipper and clamper diodes.	Theoretical Lectures	
4	**2**	**I, II**	Half-Wave , Full-Wave and Bridge rectifiers.	Theoretical Lectures	H.W
5	**2**	**I, II**	Zener diode and its application (voltage regulator)	Theoretical Lectures	H.W
6	**2**	**I**	Introduction to Bipolar junction transistors (BJT) and it is configurations	Theoretical Lectures	H.W
7	**2**	**I**	DC analysis of BJT equivalent circuits(Introduction, operating point, Fixed-bias Configuration, Emitter-bias Configuration)	Theoretical Lectures	H.W
8	**2**	**I**	Voltage-divider Bias Configuration, Collector Feedback Configuration, Emitter-follower Configuration	Theoretical Lectures	

			(common collector), common- base.		
9	**2**	**II**	Design operation of BJT configurations	Theoretical Lectures	H.W
10	**2**	**I, II**	AC analysis of BJT equivalent circuits part 1,introduction, equivalent model, re-model Fixed bias configuration, re-model Voltage-divider bias configuration	Theoretical Lectures	H.W
11	**2**	**I, II**	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 and Quiz
12	**2**	**I**	امتحان نصف فصلي	Theoretical Lectures	Exam
13	**2**	**I, II**	AC analysis of BJT equivalent circuits part 3 (re-model of Emitter-Follower Configuration, re model of common Base configuration , Re-model Collector Feedback C), Effect of RL And RS, Design example of the C.E amplifier circuit	Theoretical Lectures	
14	**2**	**I, II**	Multi stages transistor , Cascaded Systems , Direct coupling and Darlington configuration.	Theoretical Lectures	
15	2	**I**	Transistor as switch	Theoretical Lectures	
Course Structure (Lab Work Part)					

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**III, VII**	Introduction to lab experiments and devices	Experiment	
2	**2**	**III, VII**	Diode Test and Characteristics	Experiment	**Report 1** H.W
3	**2**	**III, VII**	Diode Application (Clipper circuits)	Experiment	
4	**2**	**III, VII**	Diode Application (Clamper circuits)	Experiment	**Report 2** H.W
5	**2**	**III, VII**	Half and full wave rectifiers	Experiment	H.W
6	**2**	**III, VII**	Bridge Rectifiers	Experiment	**Report 3**
7	**2**	**III, VII**	BJT types and test	Experiment	H.W
8	**2**	**III, VII**	DC characteristcs of BJT	Experiment	**Report 4**
9	**2**	**III**	Mid-term exam		Exam
10	**2**	**III, VII**	Output DC characteristcs of BJT	Experiment	**Report 4**
11	**2**	**III, VII**	Common Emitter amplifier circuits (Fixed bais and Emitter self-bias configuarion)	Experiment	
12	**2**	**III, VII**	Common Emitter amplifier circuits (Voltage Divider configuartion)	Experiment	**Report 5**
13	**2**	**III, VII**	Common Base amplifier circuits	Experiment	
14	**2**	**III, VII**	Multistage transistors	Experiment	
15	**1**	**III,VII**	Transistor as a switch	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.

Assignment & Grading	**Method (Assessment)**	**No**	**Mark**	**GO**			
				I	**II**	**III**	**VII**

	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:
Electronics principles and devices II
2. Course Code:
MTE 214
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. Omar Saadallah E-mail: omar.abdulwahid@uomosul.edu.iq
8. Course Objectives

Course Objectives	The objectives of this course are to: 1. **Linked to GO I** Use of knowledge from different topics including construction and principle of operation of JFET and MOSFET, FET as amplifier, Operational-Amplifier (Op-Amp), filters, and oscillator 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 Classworks, 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 power amplifier based FET device, Integrator and differentiator circuits based Op-Amp, low pass and high RC filters. 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 JFETs and MOSFETs, Op-Amp circuits, design and simulation of power amplifiers, active filters, and oscillators. This competency will be assessed through the experimental work of lab, Mid-term and Final Exams. 4. **Linked to GO VI** Demonstrate the ability to discover new techniques and abilities, especially in circuit design and simulation with CAD tools like Multisim. This tool is the foundation of electrical circuit design,

	and students may gradually enhance their abilities by building high-performance circuits with advanced tools. Moreover, gain experience in writing academic papers and reports required for higher education levels. This skill will be assessed through Mini Project 5. **Linked to GO VII** Function effectively on multi-disciplinary teams to analyse problems, devise solutions, and meet deadlines within the context of electronic circuit and systems. Apply collaborative problem-solving skills to topics such power amplifier based HEMT transistor, low noise amplifier, frequency synthesizer, etc. This competency will be assessed through lab work and Mini Projects.

9. Teaching and Learning Strategies

Strategy	1-Theoretical lectures 2-Laboratory experiments 3- Homeworks and Classworks 4-Exams 5-Reports 6- Research and Discussions

10. Course Structure (Theoretical Part)

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**I**	Introduction to FET transistor, FET types , and it comparison with BJT. Structure and principle of operation of enhancement & depletion type MOSFETs & JFET	Theoretical Lectures	
2	**2**	**I**	Metal–Oxide–Semiconductor Field-Effect Transistor types of MOSFETs and Basic Construction and Basic Operation and Characteristics of:- Depletion-type MOSFET (DMOSFET). Enhancement-type MOSFET (EMOSFET).	Theoretical Lectures	H.W

3	**2**	**I**	Field-Effect Transistor Biasing part 1 Fixed-Bias Configuration. Self-Bias Configuration. Voltage-Divider Biasing.	Theoretical Lectures	H.W
4	**2**	**I, II**	Field-Effect Transistor Biasing part 2 Depletion-Type MOSFETs. Enhancement-Type MOSFETs.	Theoretical Lectures	H.W and Quiz
5	**2**	**I, II**	Field-Effect Transistor Biasing part 3 Biasing circuits of MOSFETs Combination Networks (BJT with FET)	Theoretical Lectures	H.W, C.W, and Quiz
6	**2**	**I**	Small-signal ac model for a JFET and MOSFET. Small-signal ac analysis of a variety of JFET and MOSFET configurations including common drain, common gate, and common source	Theoretical Lectures	H.W and Quiz
7	**2**	**II**	Design sequence applied to FET configurations and cascaded amplifiers	Theoretical Lectures	H.W
8	**2**	**I**	Frequency response of FET amplifier (low and high frequency responses)	Theoretical Lectures	
9	**2**		Mid-Term Exam		**Exam**
10	**2**	**I, II**	Power Amplifiers, Introduction, Definitions and	Theoretical Lectures	C.W

			Amplifier classes (class A, B , AB and C)		
11	**2**	**I**	Introduction to the operational amplifier, Differential Amplifier Circuit , Op-Amp Basics, Practical OP-AMP Circuits.	Theoretical Lectures	
12	**2**	**I, II**	Applications of operational amplifier part1 (Inverting Amplifier, Non-inverting Amplifier, Unity Follower, Integrator, Differentiator)	Theoretical Lectures	
13	**2**	**I, II**	Applications of operational amplifier part2 (Comparator, Voltage Subtraction, Voltage Summing, Multiple-Stage Gains, Constant-gain Multiplier...) Special-Purpose Op-Amp Circuits , Instrumentation Amplifiers, Isolation Amplifiers ,	Theoretical Lectures	H.W
14	**2**	**I, II**	Operational Transconductance Amplifiers (OTAs)	Theoretical Lectures	
15	**2**	**I**	General Filter Considerations, Active filter The Oscillator , Feedback Oscillators and The 555 Timer as an Oscillator .	Theoretical Lectures	
Course Structure (Lab Work Part)					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**III**	Introduction		
2	**2**	**III, VII**	JFET – Characteristics (1)	**Experiment**	Quiz

3	**2**	**III, VII**	JFET – Characteristics (2)	**Experiment**	**Report 1 H.W**
4	**2**	**III, VII**	MOSFET – Characteristics (1)	**Experiment**	
5	**2**	**III, VII**	MOSFET – Characteristics (2)	**Experiment**	**Report 2 H.W**
6	**2**	**III, VII**	JFET – Amplifier (1)	**Experiment**	**Quiz**
7	**2**	**III, VII**	JFET – Amplifier (2)	**Experiment**	**Report 3**
8	**2**	**III, VII**	MOSFET – Amplifier (1)	**Experiment**	
9	**2**	**III**	MOSFET – Amplifier (2)	**Experiment**	**Report 4**
10	**2**	**III, VII**	Power amplifier	**Experiment**	**Report 5**
11	**2**	**III**	Mid-Term Exam		**Exam**
12	**2**	**III, VII**	Basic Chara. Of Operational Amplifier (1)	**Experiment**	
13	**2**	**III, VII**	Basic Chara. Of Operational Amplifier (2)	**Experiment**	**Report 6**
14	**2**	**VI,VII**	Applications of Op-AMP	**Experiment**	**Report 7**
15	**1**	**III**	Research and Discussion	Research	**Report and 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 (Assessment)	**No**	**Mark**	**GO**				
				I	**II**	**III**	**VI**	**VII**
Assignment & Grading	Midterm exam (Theoretical and lab)	1	20	15		5		
	HomeWorks+ classwork's	9	7	7				
	Quizzes	3	8	8				

	Lab work and Report	6	10			4		6
	Research/ Discussion	1	5				3	2
	Final exam (Theoretical and lab)	1	50	30	10	10		
Sum			100	60	10	19	3	8
GO%			100	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:
Digital Logic
2. Course Code:
MTE216
3. Semester / Year:
2024-2023
4. Description Preparation Date:
26/3/2024
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:
MTE 203
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 / 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	**3**	I, II	Introduction to Thermodynamics		
2	**3**	I, II	Properties of Pure Substances		

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

		No.	Marks	GOs

Assignment & Grading	**Method (Assessments)**			**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:
Heat Transfer
2. Course Code:
MTE 212
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, VI	Introduction to heat transfer		

2	2	I, II, VI	Introduction to heat transfer	Lecturer	Quizzes, Mid term, Final exam, Class Activity, Project.
3	2	I, II, VI	Introduction to conduction		
4	2	I, II, VI	One–dimensional, steady state conduction		
5	2	I, II, VI	One–dimensional, steady state conduction		
6	2	I, II, VI	Two-dimensional, steady state conduction		
7	2	I, II, VI	Two-dimensional, steady state conduction		
8	2	I, II, VI	Two-dimensional, steady state conduction		
9	2	I, II, VI	Midterm exam		
10	2	I, II, VI	Introduction to convection		
11	2	I, II, VI	Introduction to convection		
12	2	I, II, VI	Introduction to convection		
13	2	I, II, VI	Classification of heat exchangers		
14	2	I, II, VI	Classification of heat exchangers		
15	2	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:	
Fluid Mechanics	
2. Course Code:	
MTE202	
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: Dr. Laith Mohammed Jasim E-mail: 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	• Theoretical lectures • Discussion sessions
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	I	Introduction; Fluid mechanics applications in science and mechatronics engineering; Matter; Solid and Fluid (liquid and Gas)	Theoretical lectures	Activity
2	2	I, II	Dimensions, Dimensional Homogeneity, and Units; Shear and normal stress, pressure; Definition of Fluid static and dynamic	Theoretical lectures, Discussion Sessions	Assignment
3	2	I, II	Approaches to study fluid mechanics; Analytical method, Experiments, and Computation (Computation Fluid Dynamic, CFD); Definition of; Hydrodynamics, Hydraulics, Gas dynamics and Aerodynamics	Theoretical lectures	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, Newtonian and Non-Newtonian Fluids; Compressibility,	Theoretical lectures, Discussion Sessions	Activity Quizzes

			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.	Theoretical lectures	Assignment
6	2	II, VI	Standard Atmosphere; Variation of Temperature; Pressure and Density of air with the Elevation; Absolute Pressure; Gage Pressure and Vacuum Pressure,	Theoretical lectures, Discussion Sessions	Activity
7	2	I, 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.	Theoretical lectures, Discussion Sessions	Quizzes
8	2	II, VI	Pressure distribution on flat surface, Hydrostatic Force on an Inclined Plane Surface of Arbitrary shape; resultant	Theoretical lectures, Discussion Sessions	Activity

			force and location of center of pressure, centroid and parallel axis theorem		
9	2	I	Hydrostatic Force on Submerged Curve Surface.		Midterm Exam
10	2	I, II	Fluid Dynamics; Physical Quantities of Flow; Velocity, Pressure, Density, Temperature and Acceleration. Lagrangian and Eulerian Systems; Control volume method	Theoretical lectures	Activity
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	Theoretical lectures, Discussion Sessions	Activity
12	2	I, II	Elementary Equation of Motion; Differential and Control Volume Approach. Continuity Equation (Conservation of Mass) derivation, Volume and Mass Flow Rate, Applications on	Theoretical lectures	Activity

			Conservation of Mass.		
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.	Theoretical lectures, Discussion Sessions	Assignment
14	2	I, II	Application of the Bernoulli equation; Pitot Tube, Pitot-Static Tube (stagnation point), Free Jet; Flowrate Measurement.	Theoretical lectures	Activity
15	2	I	Final course Exam.		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.

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	

1. Course Name:

Fluid Mechanics

2. Course Code:

MTE 211

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)

2/2

7. Course administrator's name

Name: Dr. Laith Mohammed Jasim
Email : jasiml68@uomosul.edu.iq

8. Course Objectives

Course Objectives	1)Apply conservation of mass and energy and and Newton's second law of motion to the contents of a finite control volume to get important answers. [I, VI]. 2) Know how velocity changes and energy transfers in fluid flows are related to forces and torques[I, II]. 3) Apply the Buckingham pi theorem and develop a set of dimensionless variables for a given flow situation. [I]. 4) Apply the concepts of modeling and similitude to develop prediction equations. [I, VI]. 5) Understand various characteristics of the flow in pipes. [II]. 6) discuss the main properties of laminar and turbulent pipe flow [I, VI]. 7) Calculate losses in straight portions of pipes as well as those in various pipe system components. [I, II].

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
1	2	I	Derivation of the lin momentum equation	Theoretical lectures	Activity
2	2	I, II	Application of the Linear Momentum Equation; Change in Flow Direction; Weight, Pressure, an Change in Speed. Pressure and Change Flow Direction; Pressure, Change in Speed, and Friction;	Theoretical lectures	Assignment
3	2	I, II	Linear Momentum– Weight, Pressure, Friction, and Nonuniform Velocit Profile; Thrust; Nonuniform Pressur Moving Control Volume	Discussion Sessions	Quizzes
4	2	I, II	Derivation of the Moment-of-Momentum Equatio Application of the Moment-of-Momentum Equatio Torque and Power.	Theoretical lectures	Activity
5	2	I, II	Dimensional Analys Buckingham Pi Theorem; Determination of Pi Terms.	Theoretical lectures	Assignment
6	2	II,VI	Apply the Buckingh pi theorem.	Discussion Sessions	Quizzes
7	2	I, II, VI	Dimensionless Grou in Fluid Mechanics; Dimensionless	Theoretical lectures	Activity

			Correlation of Experimental Data;		
8	2	II, VI	Modeling and Similitude; Theory Models, Model Scal Practical Aspects of Using Models		Mid exam
9	2	I	Typical Model Stud	Theoretical lectures	Quizzes
10	2	I, II	Viscous Flow in Pip Characteristics of Pi Flow, laminar and turbulent pipe flow, Energy Consideratic	Theoretical lecture	Activity
11	2	I, II	Dimensional Analys of Pipe Flow; Major Losses, Moody cha Comparison of Laminar or Turbule	Discussion Sessions	Assignment
12	2	I,II	Minor Losses; loss coefficient of valve, entrance and exit, pi components	Theoretical lectures	Quizzes
13	2	I,II,VI	Pipe flow topics; Single pipes, Pressu drop, Head loss, Flowrate, Determine diameter	Theoretical lecture	Activity
14	2	I,II	Multiple Pipe Syste Series and parallel p systems	Discussion Sessions	Assignment
15	2	I,II	Final course 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)	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	