University Name: University of Diyala

Faculty/Institute: College of Engineering

Scientific Department: Department of Electrical Power and Machines Engineering

Academic or Professional Program Name: Bachelor

Final Certificate Name: Bachelor of science in Electrical Power and Machines Engineering

Description Preparation Date: 17/8/2026

Completion Date: 17/8/2026

Signature:

Head of Department Name:
Assit. Prof. Balasim M. Hussein

Date: 17/8/2026

Signature:

Scientific Associate Name:

Prof. Dr. Jabbar Gottmah

Date:17/8/2026

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/8/2026

Signature:

Approval of the Dean

Prof. Dr. Anees A. Khadom

MODULE DESCRIPTION FORM

Module Information

Module Title	***Digital techniques***	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	***EPE 101***	☒ **Lecture**	
ECTS Credits	**6**	☒ **Lab**	
SWL (hr/sem)	**150**	☐ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Zena khamees gurgi	**e-mail**	Zena.khamees@uodiyala.edu.iq
Module Leader's Acad. Title	Asst. Lect.	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To acquire the basic knowledge of Digital techniques levels and application of knowledge to understand digital electronics circuits. 2. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics 3. To understand and examine the structure of various number systems and its application in digital design. 4. The ability to understand, analyze and design various combinational and sequential circuits. 5. Ability to identify basic requirements for a design application and propose a cost effective solution. 6. To prepare students to perform the analysis and design of various digital electronic circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. express basic concepts and logic circuiits 2. explains number systems and convert number systems. 3. explains logical AND,OR,NOT,NAND,NOR,EX-OR,EX-NOR functions 4. can show the simplification of logical statements 5. explains the simplification of logical statements with using boolean rules and de-morgan thorems 6. writes boolean equation by using truth table and shows its logic circuits. 7. writes boolean equation by logic circuits and shows its truth table. 8. explains the simplification of logical statements with karnaugh maps. 9. identifies 10. explains half and full adders

	11. explains half and full subtractors 12. identifies combinational circuit 13. explains the working principles of decoder,encoder, 14. recognize 7-segmented displayers 15. explains the working principles of multiplexer and De multiplexer, 16. shows the applications of combinational circuits
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – number system and simplification of digital circuit design. **Introduction to digital quantities and System Numbers:** Decimal , Binary , Binary arithmetic , Octal and Hexadecimal Numbers, Conversions of System Numbers, Arithmetic Operations with different number systems, and Signed Numbers. [24 hrs] **Digital Codes**: Binary coded decimal [BCD], Exc-3 code, Graycodes. [5 hrs] **Simplification of digital circuit design:** Boolean algebra , De'Morgan theorems , Simplification Using Boolean Algebra, Standard Forms of Boolean Expressions(SOP and POS form), The karnaugh Map (Three, Four and Five-Variable Kamaugh Maps. [25 hrs] Part B - Combinational Logic **Functions of Combinational Logic:** Adders, Subtracters, Parallel Binary Adders, multiplier, and Magnitude comparators. [25 hrs]. Encoders, Decoders, Multiplexers, Demultiplexers, Parity Generators/Checkers, and code conversion cuircuits. [25 hrs]. **Flip-Flops:** Latches, Edge-Triggered Flip-Flops and its applications. [5 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Digital Techniques and logic gates
Week 2	General number formula : Binary, octal, decimal, hexadecimal numbers
Week 3	Conversions of System Numbers
Week 4	Arithmetic operations with different number systems, complements of number systems, binary codes, BCD codes, Ex-3 code , and gray code.

Week 5	Boolean algebra , De'Morgan theorems , Simplification Using Boolean Algebra,
Week 6	Standard Forms of Boolean Expressions(SOP and POS form)
Week 7	The karnaugh Map (two,Three, Four and Five- Variable Kamaugh Maps)
Week 8	The karnaugh Map (two, Three, Four and Five- Variable Kamaugh Maps)
Week 9	Introduction to Combinational Logic circuit and circuit analysis
Week 10	Adders, Subtractors, Parallel Binary Adders,
Week 11	Binary multiplier circuits and Magnitude comparators circuit.
Week 12	Encoders, and Decoders circuits
Week 13	Multiplexers, and Demultiplexers circuits.
Week 14	Parity Generators/Checkers and design of code conversion circuits.
Week 15	Flip-Flops:(Latches, Edge-Triggered Flip-Flops) and it's applications.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to logic gates
Week 2	Lab 2: NOR Gate, NAND Gate, and XOR Gate application
Week 3	Lab 3: Comparator Circuit
Week 4	Lab 4: Half –Adder
Week 5	Lab 5: full –Adder Circuit

Week 6	Lab 6: Half Subtractor
Week 7	Lab 7: full Subtractor Circuit
Week 8	Lab 8: Even and odd Parity Generator and Checker Circuit
Week 9	Lab 9: Code converter Circuits
Week 10	Lab 10: Encoder Circuit
Week 11	Lab 11: Decoder Circuit
Week 12	Lab 12: Multiplexer Circuit
Week 13	Lab 13 :De - Multiplexer Circuit.
Week 14	Lab 14 :Introduction to Flip- Flop
Week 15	Lab 15 : Flip- Flop application Circuits
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Digital Fundamentals, Thomas .L. Floyd, Pearson international edition.	Yes
Recommended Texts	Digital Design, M. Morris. Mano, Pearson prentice Hall .	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Engineering Fundamentals I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**EPE 103**			☒ **Lecture**	
ECTS Credits	**8**			☒ **Lab**	
SWL (hr/sem)	**200**			☒ **Tutorial**	
				☒ **Practical**	
				☐ **Seminar**	
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Yasir Ghazi Rashid		**e-mail**	E-mail: yasserghazee_enge@uodiyala.edu.iq	
Module Leader's Acad. Title	Asst. Lect.		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. This course deals with the basic concept of electrical circuits. 2. This is the basic subject for all electrical and electronic circuits. 3. To understand voltage, current and power from a given circuit. 4. To develop problem solving skills and understanding of circuit theory through the application of techniques. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors.

	10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Basic Concepts** Introduction, Systems of Units, Charge and Current, Voltage, Power and Energy, Circuit Elements [18 hrs] **Part B - Basic Laws** Ohm's Law, Nodes, Branches, and Loops, Kirchhoff's Laws, Series Resistors and Voltage Division, Parallel Resistors and Current Division, Wye-Delta Transformations. [15 hrs] **Part C - Methods of Analysis** Nodal Analysis, Nodal Analysis with Voltage Sources, Mesh Analysis, Mesh Analysis with Current Sources [12 hrs] **Part D - Circuit Theorems** Superposition, Source Transformation, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer [24 hrs] Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Behavior management** Behavior management strategies foster an atmosphere of mutual respect, reduce disruptive behavior and ensure students have an equal opportunity to fulfill their potential in the classroom. It's crucial to provide them with both a positive and productive learning environment. Examples include establishing a reward system with

	an interactive chart where students move up or down depending on their performance and behavior in class. **2. Blended learning** With a blended learning teaching strategy, technology is incorporated with traditional learning. This allows students to work at their own pace, research their ideas and become more physically engaged during lessons. Examples include providing interactive tablets or whiteboards with engaging activities and posting classwork online for easier access. **3. Cooperative learning** Group work is a cooperative learning strategy that allows students with various learning levels to work together. By encouraging them to express their own ideas and listen to others' ideas as a group, you help students develop communication and critical thinking skills. Examples include solving math puzzles together, performing skits as a team or working on group presentations. **4. Formative assessment** A formative assessment is used periodically to monitor student learning incrementally. This can more effectively measure the process of learning as opposed to end-of-unit tests and can help you to improve your teaching methods throughout the year. Examples of this teaching strategy include self-evaluation exercises and summarizing a topic in multiple ways. **5. Student-led teaching** The student-led teaching strategy lets students become the teacher. In a classroom with learners at different levels, you can better engage those learning faster by showing them how to teach and give feedback to their peers.They may team-teach or work in groups to teach a new topic. Examples include letting a student teach an entire lesson or having advanced writers lead a peer-editing session as well as provide constructive criticism.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 12	LO #1, #4 and #8, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #10, #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Electrical Engineering: An Overview
Week 2	• The International System of Units conversions (metric prefixes) • Free electrons, electric charge & types of electric materials

	• Definition of: electric current, electric current flowing through a conductor
Week 3	• Definition of electric voltage • Polarity of electric voltage across an element • The difference between electric potentials and electric voltage • Linear elements: resistances, conductance, capacitances, and inductances • Definition of: Power and energy, Sources (Independent Source & Dependent Source)
Week 4	• Ohm's Law • Definition of: Nodes, Branches, and Loops
Week 5	• Series & parallel connections of resistors • Series Resistors and Voltage Division • Parallel Resistors and Current Division
Week 6	• Short and Open Circuits • Wye-Delta Transformations
Week 7	Kirchhoff's Laws
Week 8	**Mid-term Exam**
Week 9	Methods of Analysis: Nodal Analysis
Week 10	Methods of Analysis: Mesh Analysis
Week 11	Circuit Theorems: Superposition, Source Transformation
Week 12	Circuit Theorems: Source Transformation
Week 13	Circuit Theorems: Thevenin's Theorem
Week 14	Circuit Theorems: Norton's Theorem, Derivations of Thevenin's and Norton's Theorems
Week 15	Circuit Theorems: Maximum Power Transfer Theorem
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Lab. Equipment's
Week 2	Lab 2: How to measure DC Voltage with a voltmeter (analog and digital)
Week 3	Lab 3: How to measure DC Current with an ammeter (analog and digital)
Week 4	Lab 4: How to measure Resistor with an ohmmeter (analog and digital)
Week 5	Lab 5: How to measure power with a wattmeter (analog and digital)
Week 6	Lab 6: How to use Avometer
Week 7	Lab 7: Resistor Color Code
Week 8	Lab 8: Ohm's Law
Week 9	Lab 9: Series, parallel and series- parallel circuits
Week 10	Lab 10: Wye-Delta Transformations
Week 11	Lab 11: Kirchhoff's Voltage and Current Laws
Week 12	Lab 12: Superposition theorems
Week 13	Lab 13: Thevenin's & Norton's theorems
Week 14	Lab 14: Maximum Power Transfer Theorem
Week 15	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Theraja, B. L. **A Textbook of Electrical Technology-Volume I (Basic Electrical Engineering)**. Vol. 1. S. Chand Publishing, 2005. • C.K. Alexander and M.N.O Sadiku, **Fundamentals of Electric Circuits**, McGraw-Hill Education, Fifth Edition, 2013	Yes
Recommended Texts	• Allan H. Robbins and Wilhelm C. Miller, **Circuit analysis: Theory and practice**, Cengage Learning, Fifth Edition, 2013. • Nilsson, James William, **Electric circuits**, Pearson Education India, 2008.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Engineering Fundamentals II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**EPE 104**			☒ **Lecture**	
ECTS Credits	**7**			☒ **Lab**	
SWL (hr/sem)	**175**			☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name: Yasir Ghazi Rashid		**e-mail**	E-mail: yasserghazee_enge@uodiyala.edu.iq	
Module Leader's Acad. Title		Asst. Lect.	**Module Leader's Qualification**		M.Sc.

Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	**Electrical Engineering Fundamentals I**	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	7. This course deals with the basic concept of AC electrical circuits. 8. To understand ac voltage and current from a given circuit. 9. To understand Root Mean-Square (R.M.S.) & Average Value 10. To understand ac power Average power, Reactive power, Complex power. 11. To analysis the RL, RC, RLC circuit analysis 12. To perform mesh and Nodal analysis in AC circuit. 13. To develop problem solving skills and understanding of circuit theory through the application of techniques.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	12. Recognize advantages of use alternating current. 13. Recognize why using Sine Waveform 14. Define inductors and capacitors. 15. How generation of alternating voltages and currents. 16. Recognize Phasor representation of AC quantities. 17. Define Ohm's Law in AC. Circuits. 18. Identify the basic circuit elements and their applications. 19. Explain the two Kirchoff's laws used in circuit analysis. 20. Discuss the Sinusoidal Steady-State Analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - A.C. Fundamentals** Introduction, Sinusoids, Phasors, Phasor Relationships for Circuit Elements, Root Mean-Square (R.M.S.) & Average Values, Impedance and Admittance, [18 hrs] **Part B - A.C Circuit** Introduction, Capacitors, Series and Parallel Capacitors, Inductors, Series and Parallel Inductors, Series A.C. circuits, Parallel A.C. Circuits, Kirchhoff's Laws in the Frequency Domain, Impedance Combinations. [15 hrs] **Part C - Sinusoidal Steady-State Analysis** Nodal Analysis, Nodal Analysis with Voltage Sources, Mesh Analysis, Mesh Analysis with Current Sources, Superposition Theorem, Thevenin and Norton Equivalent Circuits [24 hrs] **Part D - Frequency Response** Series Resonance, Parallel Resonance, [6 hrs] Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**1. Behavior management** Behavior management strategies foster an atmosphere of mutual respect, reduce disruptive behavior and ensure students have an equal opportunity to fulfill their potential in the classroom. It's crucial to provide them with both a positive and productive learning environment. Examples include establishing a reward system with an interactive chart where students move up or down depending on their performance and behavior in class. **2. Blended learning** With a blended learning teaching strategy, technology is incorporated with traditional learning. This allows students to work at their own pace, research their ideas and become more physically engaged during lessons. Examples include providing interactive tablets or whiteboards with engaging activities and posting classwork online for easier access. **3. Cooperative learning** Group work is a cooperative learning strategy that allows students with various learning levels to work together. By encouraging them to express their own ideas and listen to others' ideas as a group, you help students develop communication and critical thinking skills. Examples include solving math puzzles together, performing skits as a team or working on group presentations. **4. Formative assessment** A formative assessment is used periodically to monitor student learning incrementally. This can more effectively measure the process of learning as opposed to end-of-unit tests and can help you to improve your teaching methods throughout the year. Examples of this teaching strategy include self-evaluation exercises and summarizing a topic in multiple ways. **5. Student-led teaching** The student-led teaching strategy lets students become the teacher. In a classroom with learners at different levels, you can better engage those learning faster by showing them how to teach and give feedback to their peers. They may team-teach or work in groups to teach a new topic. Examples include letting a student teach an entire lesson or having advanced writers lead a peer-editing session as well as provide constructive criticism.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	100	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 12	LO #1, #4 and #8, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #10, #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Introduction: AC Circuits, A.C. Fundamentals, Types of waveforms
Week 2	• Definition of: Waveform, Instantaneous value, Cycle, Time period, Frequency, Amplitude, Peak-to-peak value, Phase, Phase angle, Phase difference, Angular Frequency
Week 3	Root-Mean-Square (R.M.S.) & Average Values
Week 4	• Capacitors, Series and Parallel Capacitors • Inductors, Series and Parallel Inductors
Week 5	• A.C. Through Resistance, Inductance and Capacitances
Week 6	Series A.C. circuits
Week 7	Parallel A.C. circuits: Vector or Phasor Method, Admittance Method (Y), Complex or Phasor Algebra
Week 8	**Mid-term Exam**
Week 9	• Kirchhoff's Laws in the Frequency Domain • Impedance Combinations • Wye-to-Delta transformations
Week 10	Sinusoidal Steady-State Analysis: Nodal Analysis, Mesh Analysis
Week 11	Sinusoidal Steady-State Analysis: Mesh Analysis
Week 12	Circuit Theorems: Superposition, Source Transformation
Week 13	Circuit Theorems: Thevenin and Norton Equivalent Circuits
Week 14	AC Power Analysis: Power Triangle, Power Factor, Complex Power
Week 15	Frequency Response: Series Resonance, Parallel Resonance
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: A.C. Measurement Instruments
Week 2	Lab 2: Introduction to Oscilloscope
Week 3	Lab 3: Inductors
Week 4	Lab 4: Capacitors
Week 5	Lab 5: Ohm's Law in A.C. Circuits
Week 6	Lab 6: Series and Parallel Combinations
Week 7	Lab 7: Wye-Delta Transformations
Week 8	Lab 8: Kirchhoff's Laws in the Frequency Domain
Week 9	Lab 9: Superposition theorems
Week 10	Lab 10: Thevenin's theorems
Week 11	Lab 11: Norton's theorems
Week 12	Lab 12: Power in AC circuit
Week 13	Lab 13: Series Resonance
Week 14	Lab 14: Parallel Resonance
Week 15	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	• Theraja, B. L. **A Textbook of Electrical Technology-Volume I (Basic Electrical Engineering)**. Vol. 1. S. Chand Publishing, 2005. • C.K. Alexander and M.N.O Sadiku, **Fundamentals of Electric Circuits**, McGraw-Hill Education, Fifth Edition, 2013	Yes
Recommended Texts	• Allan H. Robbins and Wilhelm C. Miller, **Circuit analysis: Theory and practice**, Cengage Learning, Fifth Edition, 2013. • Nilsson, James William, **Electric circuits**, Pearson Education India, 2008.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**MATHEMATICS I**			**Module Delivery**	
Module Type	BASIC			**Theory** **Lecture** **Tutorial**	
Module Code	**E-101**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1 1		**Semester (s) offered**	1	
Administering Department			**College**	Engineering	
Module Leader	Ali Sachit Kaittan		**e-mail**	alisachit@uodiyala.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	MSC in Electrical Power	

Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Review Committee Approval		**Version Number**	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**None**	**Semester**	-
Co-requisites module	None	**Semester**	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	This module aims to provide students with an understanding of, and competence in the use of, mathematical techniques that are relevant to the solution of engineering problems. It will also give students a firm foundation from which to develop solutions to a wider and deeper range of engineering problems that they will encounter throughout their undergraduate engineering program of study.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Preliminaries : Explain mathematical coordinate systems, representing line, slope of line, shifting of lines 2. Vectors: Demonstrate an understanding of vectors in plane and space. 3. Function: Demonstrate an understanding of function and related variables, range and domain of function, types of functions and their graphs. 4. Limits and Continuity: Demonstrate an understanding of the fundamental concepts of calculus including limits, continuity, and differentiability. 5. Derivatives: Apply the techniques of differentiation at different types of functions including transcendental functions 6. Applications of derivatives: Apply the techniques of differentiation to solve problems involving rates of change, linearization, curve sketching, mean value theorem and Initial value problem. 7. Complex numbers: Demonstrate an understanding of complex numbers with basic operations and their mathematical and graphical representations including Euler's Formula		
Indicative Contents	The topics listed under the indicative content below are the underpinning		

المحتويات الإرشادية	areas of knowledge and understanding that will be obtained from successful completion of the module. The mathematical topics are illustrated in the context of relevant engineering scenarios. • **Preliminaries** Cartesian coordinates, polar coordinates, slope of lines, angle of inclination. • **Functions**, types of functions, graph of the functions, domain and range of function • **Review of trigonometric function:** graph of trigonometric function, range and domain of trigonometric functions, identities. • **Limits and Continuity:** Properties, limits involving infinity, continuity. • **Transcendental functions**: Inverse function, graph of inverse function, Logarithmic and exponential functions, inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions. • **Derivatives:** Definition, rules of derivative, Implicit differentiation, L hospital's rule, derivative of inverse functions • **Applications of derivatives:** rate of change problems, Relative maximum and relative minimum, Curve sketching with 1^{st} and 2^{nd} derivative, Linearization, Mean value theorem, Initial value problem,. • **Complex numbers:** Basic definitions. The geometric representations of the complex numbers**,** argand diagram, Basic operations with complex numbers, Euler's Formula • **Vectors**: Introduction to vectors
Course Description	This course lays the foundation for a robust understanding of mathematical concepts that underpin the various disciplines within engineering. It covers a breadth of topics ranging from coordinate systems, slopes of lines, and angles of inclination to the introduction of two- and three-dimensional coordinate systems. A focus is also given to the understanding and manipulation of functions, including domain and range determination and function composition. The course incorporates a substantial overview of trigonometry, limits, continuity, derivatives, including their applications in real-world engineering contexts in addition to complex numbers and their mathematical representation. By the end of the course, students will have a sound understanding of these principles, preparing them for more advanced engineering courses in their respective fields.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin In Mathematics I, then employ a range of teaching strategies to ensure first-year engineering students fully grasp the various mathematical concepts. Instructional methods include interactive lectures, where core mathematical principles are explained in detail, and practical problem-solving sessions to provide hands-on learning experiences. Collaborative group work encourages peer-to-peer learning and reinforces understanding through shared insights. Regular formative assessments will be conducted to monitor students'

	understanding of the material, and feedback will be promptly given to guide their learning process. Instructors will maintain office hours for personalized support, and online resources will be available to supplement classroom instruction. Emphasis will be placed on relating mathematical concepts to real-world engineering applications to make the learning experience more relevant and engaging. These strategies aim to develop students' critical thinking skills, enhance their problem-solving abilities, and prepare them for advanced engineering studies.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** **53** **In class tests** **10** **Tutorial** **15**	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Assignment** **20** **Preparation for tests** **20** **Homework** **32**	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3,5, 10, 12, 14	LO #1, 2, 3, 4 ,5 and 7
	Assignments	6	20% (20)	4, 8, 12	LO # 1, 2, 3, 4, 5 and 6

Summative assessment	**Midterm Exam**	2	20% (20)	7	LO # 1,4
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Cartesian coordinates, slope of lines, angle of inclination, functions, types of functions, graph of the functions, domain and range ,identifying functions, Circles and parabolas
Week 2	Introduction to vectors
Week 3	•Preliminaries Sum, differences, products and quotients of Composite functions, shifting a graph of a function, scaling and reflecting a graph of a function, Absolute value
Week 4	•Review of trigonometric function graph of trigonometric function, range and domain, identities
Week 5	•Limits and Continuity Properties, limits involving infinity, continuity
Week 6	•Transcendental functions Inverse function, graph of inverse function, Logarithmic and exponential functions, trigonometric functions , inverse trigonometric functions, hyperbolic functions, inverse hyperbolic functions
Week 7	•Derivatives Definition, rules of derivative, slopes , tangent lines, chain rule, derivative of trigonometric functions, Implicit differentiation, L hospital's rule
Week 8	derivative of inverse trigonometric functions, derivative of exponential and logarithmic functions
Week 9	•Applications of derivatives Speed and acceleration, Relative maximum and relative minimum
Week 10	Curve sketching with 1st and 2nd derivative
Week 11	Linearization
Week 12	rate of change problems
Week 13	Mean value theorem -Initial value problem
Week 14	Complex numbers**:** Basic definitions. The geometric representations of the complex numbers**,** argand diagram

Week 15	Basic operations with complex numbers, Euler's Formula
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	George B. Thomas and Ross L. Finney, "Calculus and Analytic Geometry, Addison- Wesley	Yes
Recommended Texts	Thomas Calculus, by George B.Thomas,Jr,Elevnth Edition Media Upgrade 2008	Yes
Websites		

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**MATHEMATICS II**			**Module Delivery**	
Module Type	BASIC			**Theory** **Lecture** **Tutorial**	
Module Code	E 102				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1	1	**Semester (s) offered**	2	
Administering Department			**College**		
Module Leader	Ali Sachit Kaittan		**e-mail**	alisachit@uodiyala.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**	1.0	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**MATHEMATICS I**	**Semester**	1

Co-requisites module	None	**Semester**	-

Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

Module Aims أهداف المادة الدراسية	This module aims to provide students with an understanding of, and competence in the use of, mathematical techniques that are relevant to the solution of engineering problems. It will also give students a firm foundation from which to develop solutions to a wider and deeper range of engineering problems that they will encounter throughout their undergraduate engineering program of study.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. Integration: Demonstrate an understanding of the fundamental concept of integration and antiderivative including types of integrations 9. Integration and transcendental functions: Extend the concept of integration to cover the integration of different types of transcendental functions 10. Numerical integration: Explain the fundamentals of numerical integration focusing on trapezoidal rule and Simpson's rule**.** 11. Methods of integration: Apply the techniques of integration to evaluate the integrals that cannot be solved directly. 12. Application of definite integrals: Extend the concept of integration to solve several problems involving area, volume, length of curve, surface area by revolution, center of mass and moment of inertia. 13. Area with polar coordinates: Demonstrate an understanding of polar coordinate system and its difference with Cartesian coordinate system, graphing and problems solution of such system. 14. Matrix: Explain the concept of matrix in mathematics, matrix algebra and solution of system of linear equations.
Indicative Contents المحتويات الإرشادية	The topics listed under the indicative content below are the underpinning areas of knowledge and understanding that will be obtained from successful completion of the module. The mathematical topics are illustrated in the context of relevant engineering scenarios. • **Integration:** Definition, antiderivative, definite and indefinite integral**.** • **Integration and transcendental functions:** integration of trigonometric and inverse trigonometric functions, integration of exponential and logarithmic functions, Integration of hyperbolic and inverse hyperbolic functions. • **Numerical integration:** Introduction, trapezoidal rule and Simpson's rule**.** • **Methods of integration:** Substitution method, integration by parts**,**

	Trigonometric substitution method**,** integration by partial fraction**.** • **Application of definite integrals:** Area**,** Volume**,** Lengths of curves in the plane**,** Areas of surfaces of revolution, Center of mass, moment of inertia**.** • **Area of polar coordinates**: Definition, polar equation, relating polar and Cartesian coordinates, Graph in polar coordinates, applications using polar coordinate system • **Matrix:** definition, matrix algebra, Determinant of matrix, Grammar's rule, Inverse of matrix, Gauss Elimination Method
Course Description	This course discuss the foundation for a robust understanding of mathematical concepts that underpin the various disciplines within engineering. It covers the integration and its types followed by methods of integration. The concept of numerical integration is also highlighted. Students will be able to utilize integration to solve several problems such as area between curves and volume by revolution. A focus is also given to the understanding of polar coordinate system and how to graph the curves and solve difficult integral in an easy way using such system. Matrix topic is also covered in this course so the students will be able to solve system of linear equations using matrix in different approaches. By the end of the course, students will have a sound understanding of these principles, preparing them for more advanced engineering courses in their respective fields
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin In Mathematics II, then employ a range of teaching strategies to ensure first-year engineering students fully grasp the various mathematical concepts. Instructional methods include interactive lectures, where core mathematical principles are explained in detail, and practical problem-solving sessions to provide hands-on learning experiences. Collaborative group work encourages peer-to-peer learning and reinforces understanding through shared insights. Regular formative assessments will be conducted to monitor students' understanding of the material, and feedback will be promptly given to guide their learning process. Instructors will maintain office hours for personalized support, and online resources will be available to supplement classroom instruction. Emphasis will be placed on relating mathematical concepts to real-world engineering applications to make the learning experience more relevant and engaging. These strategies aim to develop students' critical thinking skills, enhance their problem-solving abilities, and prepare them for advanced engineering studies.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem)	78	**Structured SWL (h/w)**	5.6

الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures** **53** **In class tests** **10** **Tutorial** **15**		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Assignment** **20** **Preparation for tests** **30** **Homework** **22**	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	3,5, 10, 12, 14	LO #1, 2, 3, 4 ,5 and 7
	Assignments	6	20% (20)	4, 8, 12	LO # 1, 2, 3, 4, 5 and 6
Summative assessment	**Midterm Exam**	2	20% (20)	7	LO # 1,4
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Integration:** Definition, antiderivative, definite and indefinite integral

Week 2	**Integration and transcendental functions:** (trigonometric and inverse trigonometric functions, exponential and logarithmic functions)
Week 3	**Integration and transcendental functions:** Integration and transcendental functions (hyperbolic and inverse hyperbolic functions)
Week 4	• **Numerical integration** Introduction, trapezoidal rule and Simpson's rule
Week 5	• **Methods of integration** Substitution method, integration by parts
Week 6	• **Methods of integration** Trigonometric substitution method
Week 7	• **Methods of integration** Integration by partial fraction method**.**
Week 8	• **Application of definite integrals** Areas under the curve, area between curves,
Week 9	• **Application of definite integrals** Volume by revolution
Week 10	• **Application of definite integrals** Length of curve in the plane**,** Area of surface of revolution
Week 11	• **Application of definite integrals** Center of mass, moment of inertia
Week 12	• **Application of definite integrals** Area by polar coordinates
Week 13	• **Matrix** Definition, matrix algebra
Week 14	• **Matrix** Determinant of matrix, Grammar's rule
Week 15	• **Matrix** Inverse of matrix, Gauss Elimination Method
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	George B. Thomas and Ross L. Finney, "Calculus and Analytic Geometry, Addison- Wesley	Yes
Recommended Texts	Thomas Calculus, by George B.Thomas,Jr,Elevnth Edition Media Upgrade 2008	Yes
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Electronic Physics**	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	**EPE 107**	☒ **Lecture**	
ECTS Credits	6	☐ **Lab**	
SWL (hr/sem)	150	☐ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level		**Semester of Delivery**	
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Hassan Jasim Mohammed	**e-mail**	hassanjasim@uodiyala.edu.iq
Module Leader's Acad. Title	Assist. Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (Hassan Jasim Mohammed)	**e-mail**	hassanjasim@uodiyala.edu.iq
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/010/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. To develop problem solving skills and understanding of electronics theory through the application of techniques. 8. To understand Atomic structures and energy level. 9. To understand voltage, current and electronics device from a given circuit. 10. This course deals with the basic concept of semiconductors materials. 11. This is the basic subject for all semiconductors and electronic circuits. 12. To understand diode circuit and semiconductor problems. .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 17. Recognize base of Atomic structures . 18. List the various terms associated with electronics. 19. Summarize what is meant by a basic Energy Levels and Atomic Structure. 20. Describe the Electrical Conduction in Metals. 21. Describe electrical power, charge, and current. 22. Discuss Mobility and Conductivity, Energy Distribution of Electrons,. 23. Identify the basic Semiconductors Materials. 24. Discuss the (Si , Ge and Compound Semiconductors) , Extrinsic Semiconductors. 25. Discuss the various properties Semiconductor p – n Junction. 26. Explain the Current – Voltage Characteristics , Charge Control Description of a Diode. 27. Identify the Other types of semiconductor diodes .

	28. Half wave and Full wave rectifier ,clipping and clamping circuit.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Atomic Theory</u> Atom, Models, Wave Nature of Light, Dual Nature of Matter, Wave Function, Heisenberg's Uncertainty Principle, Energy – Band Theory of Metals, Insulators and Semiconductors, Crystal Structure,Ionic,Covalent and Metallic Bonding, Energy Hand of Crystals. Internal Structure of Materials Cell, Packing Miller Indices, Crystal Planes and Directions, Braggs Law and x – ray Diffraction Electronic Ballistics. [15 hrs] Mobility and Conductivity, Energy Distribution of Electrons, Fermi Level, Work Function. [10 hrs] Semiconductors Materials (Si , Ge and Compound Semiconductors) , Extrinsic Semiconductors , Fermi – Level in SemiConductor , Diffusion and Carrier Life Time , Hall Effect. [15hrs] p-n Junction in Equilibrium , Current – Voltage Characteristics , Charge Control Description of a Diode Transition and Diffusion Capacitances , Diode Switching Times , Diode Models , Small – Signal Model and Load Line Concept , Introduction to Heterojunctions and Double Heterojunctions [15 hrs] Varactor Diode, Tunnel Diode, Photodiode and Photovoltaic (Solar) Cell, Light – Emitting Diode, Principle and Operation of Semiconductor Laser. Electronic Ballistics Semiconductor Diode. [10hrs] Half wave and Full wave rectifier ,clipping and clamping circuit.[10hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

	Projects/seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The Atom, Models, Wave Nature of Light, Dual Nature of Matter, Wave Function, Heisenberg's Uncertainty Principle.
Week 2	Energy – Band Theory of Metals, Insulators and Semiconductors, Crystal Structure, Ionic.
Week 3	Covalent and Metallic Bonding, Energy Hand of Crystals. Internal Structure of Materials Cell.
Week 4	Packing Miller Indices, Crystal Planes and Directions, Braggs Law and x – ray Diffraction Electronic Ballistics.
Week 5	Mobility and Conductivity.
Week 6	Energy Distribution of Electrons, Fermi Level, Work Function.
Week 7	Introduction Semiconductors Materials (Si , Ge and Compound Semiconductors).
Week 8	Extrinsic Semiconductors , Fermi – Level in Semiconductor.
Week 9	Diffusion and Carrier Life Time , Hall Effect .
Week 10	p-n Junction in Equilibrium , Current – Voltage Characteristics.
Week 11	Charge Control Description of a Diode Transition and Diffusion Capacitances , Diode Switching

	Times.
Week 12	Diode Models , Small – Signal Model and Load Line Concept.
Week 13	Varactor Diode, Tunnel Diode, Photodiode and Photovoltaic (Solar) Cell, Light – Emitting Diode.
Week 14	Principle and Operation of Semiconductor Laser. Electronic Ballistics Semiconductor Diode.
Week 15	Half wave and Full wave rectifier ,clipping and clamping circuit.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Introduction to physical Electronics By: Bill Wilson	Yes
Recommended Texts	فيزياء الالكترونيات ,د .صبحي سعيد	No
Websites	https://www..edouniversity.edu.ng/oer/lecturenotes/electricalelectronic-engineering	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**

Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**WORKSHOPS SKILLS**	**Module Delivery**
Module Type	**BASIC**	☐ **Theory**
Module Code	**EPE 102**	☐ **Lecture**
ECTS Credits	**3**	☐ **Lab**
SWL (hr/sem)	**75**	☐ **Tutorial** ☒ **Practical** ☐ **Seminar**

Module Level		2	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Yasseen Alwan Jaddoa		**e-mail**	yasseenalwan_eng@uodiyala.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		MSc.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	**أ- الاهداف المعرفية** **1-** أفهام وتعليم الطالب مفاهيم ومبادى مادة الورش الهندسية العامة . **2-** تمكين الطلبة من الحصول على المعرفة والفهم الكامل لكافة مهارات الورش الهندسية . **3-** افهام الطالب وتعريفه بكافة المهارات نظريا وعمليا وتعريفه بكافة أجزاء الماكنة التي يتم تطبيق المهارة بالإضافة الى التطبيق العملي على الماكنة لكل طالب ولكافة المهارات. **4-** تمكين الطلبة من الحصول على المعرفة والفهم لكل أجزاء الماكنة وفائدة كل جزء .

	5- تمكين الطلبة من الحصول على المعرفة والفهم على تشخيص انواع الاعمال التي تنجزها كل ماكنة وطريقة العمل عليها . **ب – الأهداف المهاراتية الخاصة بالبرنامج** **1** - شرح المهارات بالتفصيل وتطبيقها على الماكنة عمليا والتاكيد على الطلبة بضرورة الالتزام بقواعد السلامة المهنية. **2** - تزودهم بمعلومات وطرق حل المشاكل العملية المتعلقة بجميع المهارات. **3** - يتم عرض مواضيع كافة المهارات نظريا. **4** - يتم التركيز على العملي في المهارات وضرورة مشاركة الطالب في العملي.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**مخرجات التعلم للمادة الدراسية** **1-** بناء الطالب علميا وعمليا وتأهيله للعمل في مجال تقنيات الهندسة. **2-** بناء وإعداد الطالب نفسيا ليقوم بدوره كمهندس يعتمد عليه في هذا المجال. **3-** بناء طلبة قادرين على التنافس مع مهندسين اخرين لفرص العمل و الحصول على المقاعد المطلوبة في اكمال دراسات عليا. **4-** قابلية التقديم لاختبارات خارجية من قبل هيئات محليةأو أقليمية أو عالمية لغرض اكمال الدراسة او التعيين. **5-** حث الطالب على الإبداع والتفكير في مشاريع التخصص ومواكبة التطور الحاصل في هذا المجال. **6-** تزويد الطلبة بمهارات علمية وعملية ومهارات ذاتية تمكنه من حل المشاكل العملية والتعامل معها بمفاهيم علمية.
Indicative Contents المحتويات الإرشادية	**المحتويات الإرشادية** **اولا-: السلامة المهنية.** يتم تعريف الطالب بقواعد وإجراءات السلامة المهنية لجميع المهارات وجميع الأقسام لاجل سلامة المستخدم من مخاطر التعامل مع هذه الأدوات والمكائن (3 ساعات). **ثانيا-: مهارة القياسات**. شرح نظري لمهارة القياسات وتعريف الطالب بجميع العدد والأدوات المستخدمة في عملية القياس بالتفصيل ومن ثم يتم التطبيق العملي لمهارة القياسات حيث يقوم كل طالب باجراء عملية القياس لمختلف الأدوات إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات) **ثالثا:- مهارة اللحام** . شرح نظري لمهارة اللحام وتعريف الطالب بجميع العدد والأدوات المستخدمة في عملية اللحام وشرح طرق اللحام بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بعملية اللحام وذلك لاكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات).

رابعا:- مهارة البرادة . شرح نظري لمهارة البرادة وتعريف الطالب بجميع العدد والأدوات المستخدمة في عملية البرادة وشرع طرق البرادة بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بعملية البرادة يدويا وذلك لاكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات). **خامسا:- مهارة السباكة .** شرح نظري لمهارة السباكة وتعريف الطالب بجميع العدد والأدوات المستخدمة في عملية السباكة وشرع طرق السباكة بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بعملية السباكة يدويا وذلك لاكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات) **سادسا:- مهارة التفريز .** شرح نظري لمهارة التفريز وتعريف الطالب بجميع أجزاء ماكنة التفريزاضافة الى العدد والأدوات المستخدمة في عملية التفريز وشرع طرق التفريز بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بالعمل على ماكنة التفريز وتنفيذ التمارين المختلفةعلى الماكنة وذلك من اجل اكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات). **سابعا:- مهارة التجليخ .** شرح نظري لمهارة التجليخ وتعريف الطالب بجميع أجزاء ماكنة التجليخ اضافة الى العدد والأدوات المستخدمة في عملية التجليخ وشرع طرق التفريز بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بالعمل على ماكنة التفريز وتنفيذ التمارين المختلفةعلى الماكنة وذلك من اجل اكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات). **ثامنا:- مهارة الخراطة .** شرح نظري لمهارة الخراطة وتعريف الطالب بجميع أجزاء ماكنة الخراطة اضافة الى العدد والأدوات المستخدمة في عملية الخراطة وشرع طرق الخراطة بالتفصيل إضافة الى التطبيق العملي حيث يقوم كل طالب بالعمل على ماكنة الخراطة وتنفيذ التمارين المختلفةعلى الماكنة وذلك من اجل اكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات). **تاسعا:- مهارة التأسيسات الكهربائية .** شرح نظري لمهارة التأسيسات الكهربائية وتعريف الطالب بجميع العدد والأدوات المستخدمة في عمليات التأسيسات الكهربائية وشرع طرق التأسيسات الكهربائي إضافة الى التطبيق العملي حيث يقوم كل طالب بالعمل على ربط الدوائر الكهربائية المختلفة وذلك من اجل اكتساب الخبرة العملية إضافة الى تسليم ومناقشة التقارير الخاصة بالمهارة (6ساعات).	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	***امتحانات يومية باسئلة عملية وعلمية.** ***درجات مشاركة لاسئلة المنافسة الصعبة بين الطلاب .** ***وضع درجات للواجبات البيتية والتقاريرالمكلفة بهم.** ***امتحانات فصلية للمنهج الدراسي اضافة الى امتحان نصف السنة والامتحان النهائي.**

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects /	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	30% (30)	16	All

	practical	1hr	10%(10)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	شرح نظري وعملي لمبادئ السلامة المهنية وبيان خطورة عدم الالتزام بها على حياة الطالب.
Week 2	شرح نظري لمهارة القياسات وتعريف جميع العدد والأدوات المستخدمة في القياس.
Week 3	تطبيق عملي لمهارة القياسات.
Week 4	شرح نظري لمهارة اللحام وتعريف جميع العدد والأدوات المستخدمة في عملية اللحام.
Week 5	تطبيق عملي لمهارة اللحام.
Week 6	شرح نظري لمهارة البرادة وتعريف جميع العدد والأدوات المستخدمة في عملية البرادة.
Week 7	تطبيق عملي لمهارة البرادة.
Week 8	شرح نظري لمهارة السباكة وتعريف جميع أجزاء فرن السباكة.
Week 9	تطبيق عملي لمهارة السباكة.
Week 10	شرح نظري لمهارة التفريز وتعريف الطالب بجميع أجزاء ماكنة التفريز.
Week 11	تطبيق عملي لمهارة التفريز.
Week 12	شرح نظري لمهارة التجليخ وتعريف الطالب بجميع أجزاء ماكنة التجليخ.
Week 13	تطبيق عملي لمهارة التجليخ.
Week 14	شرح نظري لمهارة التاسيسات الكهربائية مع التطبيق العملي.
Week 15	شرح نظري لمهارة الخراطة وتعريف الطالب بجميع أجزاء ماكنة الخراطة.

Week 16	تطبيق عملي لمهارة الخراطة.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	التعريف بمبادئ السلامة المهنية.
Week 2	شرح مهارة القياسات.
Week 3	شرح مهارة اللحام.
Week 4	شرح مهارة البرادة.
Week 5	شرح مهارة السباكة
Week 6	شرح مهارة التجليخ.
Week 7	شرح مهارة الخراطة والتفريز.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	MECH6014 - Mechanical Workshop Practice Tarafdar, J.C. and Raliya, R., "The Nanotechnology", Published by Scientific Publisher (SP), India, (2012).	Yes
Recommended Texts	MECH6028 - Mechanical Workshop Practice 2 - CIT Modules	No
Websites	https://www.coursera.org/browse/workshop-and-engineering/workshop -	

Grading Scheme

مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	BASIC			☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EPE 106				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	1		**Semester (s) offered**	2	
Administering Department	Electronics Engineering		**College**	Engineering	
Module Leader	Yaser I. Jasem		**e-mail**	Yaser_ij@uodiyala.edu.iq	
Module Leader's Acad. Title	Assist. Proff.		**Module Leader's Qualification**	MS.c.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**	1.0	

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	-
Co-requisites module	None	**Semester**	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Engineering drawing is the principal method of communication for engineers, the objective is to introduce the students, to the techniques of constructing the various types of polygons, curves and scales. In addition to engineering drawing, students become familiar with the AutoCAD user interface. Understand the fundamental concepts and features of AutoCAD. Use the precision drafting tools in AutoCAD to develop accurate technical drawings—present drawings in a detailed and visually impressive manner.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this course the students will be able to: 1- Get information about the important tools for engineering drawing. This will give student basic knowledge of technical drawings professions and means of communications to others. 2- Learning how to draw the shapes, angels and lines and others which is essential for engineer 3- Develop student's imagination and ability to represent the shape size and specifications of physical objects. 4- Understand the main idea of using dimension for engineering drawing 5- Familiarize with different drawing equipment, technical standards and procedures for construction of geometric figures. This will give students ability to draw three-dimension objects on the paper and to draw the pectoral drawings. 6- Explain the principle of projection and sectioning 7- Utilize the power and precision of AutoCAD as a drafting and design tool used in the mechanical design and manufacturing industries. 8- Apply basic CAD concepts to develop and construct accurate 2D geometry through creation of basic geometric constructions. 9- Create, manipulate and edit 2D drawings and figures. 10- Apply elements of mechanical drafting such as layers, dimensions, drawing formats, and 2D figures in projects.		
Indicative Contents	Indicative content includes the following.		

المحتويات الإرشادية	• Paper size, Lettering & title blocks • Orthographic projection • Isometric and oblique projection • Perspective drawing • Basic geometrical solids • Development of surfaces • **Creating Basic Drawings** • Manipulating Objects • Implementing Drawing Organization and Inquiry Commands • Altering Objects • Annotate a Drawing • Dimension Drawings • Hatching Objects • Creating Additional Drawing Objects and working on Projects • Plotting the Drawing Output
Course Description	This course introduces students to the introduction to the drawing tools and how to use them, lines drawing, Basic engineering processes, Composition of the engineering drawings, Letters, numbers, dimensions, Projection, Sectioning, Isometric drawing. Understand the fundamental concepts and features of AutoCAD. Use the precision drafting tools in AutoCAD to develop accurate technical drawings. Present drawings in a detailed and visually impressive manner. Develop a level of comfort and confidence with AutoCAD through hands-on experience.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Begin to establish a strong conceptual understanding of the principles of engineering drawing. Use the reality of work examples and measurements to help students relate abstract concepts to the planning. Encourage discussions and questions to clear up any misconceptions. In addition, provide students with the tool to deal with schematic problems. Encourage active participation and group discussions to enhance critical thinking and problem-solving skills. Guide students through the problem-solving process and provide constructive feedback.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل **In class lectures**	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2

Lab **Practical** **In class tests** **Final Exam**			
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل **Library, dorm, home memorizing** **Preparation for tests** **Homework**	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	5, 12	LO #1, 2, 3,7,8 and LO# 4,5,6,9,10
	Assignments	6	5% (5)	7, 12	LO # 7, 8 and LO# 9,10
	Homework	2	20% (20)	Continuous	
Summative assessment	**Midterm Exam**	2	10% (10)	7	LO #1, 2, 3,4,7,8 and LO# 4,5,6,9,10
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	- Definition of tools and how to use them, - Introduction 1. Status Bar and Command Prompt 2. AutoCAD Commands 3. Dynamic Input 4. Menus, Ribbons, and Toolbars 5. Cursor and Colors

	6. Undo and Redo
Week 2	- Initial principles of drawing, - Drawing Aids 1. Open Existing Drawings 2. Creating a New Drawing 3. Saving Drawings **4.** Exiting AutoCAD
Week 3	- Letters and numbers, 5. SNAP Command 6. Grid Command 7. Running Object Snaps 8. Osnap Settings **9.** UNITS Command
Week 4	- Dimensions, - Draw Commands 1. Line Command 2. Cartesian Coordinate System 3. Orthogonal Lines **4.** Polar Tracking
Week 5	- Line drawing, - 5. Circles 6. Arc Command 7. Polyline Command **8.** Explode Command
Week 6	- Line drawing, 9. Rectangle 10. Ellipse
Week 7	- Engineering operations, - Edit Commands 1. The Move Command 2. The Copy Command 3. The Offset Command 4. The Extend Command **5.** Trim Command
Week 8	- Engineering operations, 6. The Erase Command 7. The Zoom Command 8. The Pan Command 9. The Mirror Command 10. The Rotate Command **11.** The Scale Command
Week 9	- Projection drawing, 12. The Break Command

	13. The Stretch Command **14.** The Explode Command
Week 10	- Projection drawing, 15. The Fillet Command 16. The Chamfer Command 17. The Array Command **18.** The Lengthen Command
Week 11	- Projection drawing, - Dimensions 1. Linear Dimensions
Week 12	- Drawing of sectional Views, 2. Aligned Dimensions **3.** Radial Dimensions
Week 13	- Drawing of sectional Views, 4. Angular Dimensions **5.** Continued and Baseline Dimensions
Week 14	- Isometric, 6. Modifying Dimensions
Week 15	- Isometric, 7. Dimension Styles * Creating
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Parkinson, A.C., 1961. A First Year Engineering Drawing 2. J Luzadder, W., 1965. Fundamentals of Engineering Drawing, by Warren J. Luzadder. Prentice-hall. 3. Text book 1: James A. Leach, "AutoCad 2002 companion", 2003. 4. Text book 2: AutoCAD 2D Tutorials, AutoCAD 2013, By Kristen S. Kurland, 2012.	Yes
Recommended Texts	3. Text book 3: 2D_AutoCAD.	Yes
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics**			**Module Delivery**	
Module Type	**Support**			☒ **Theory**	
Module Code	**EPE 105**			☒ **Lecture**	
ECTS Credits	**5**			☐ **Lab**	
SWL (hr/sem)	**125**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	1	**Semester of Delivery**	1		
Administering Department	EPE	**College**	E		
Module Leader	AHMED M. KHADHIM	**e-mail**	E-mail		

Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding principles of static and dynamic mechanics and principles of strength of material and their applications. 2. To understand the basic concepts of Statics: forces, moment of forces, Equilibrium, analysis of trusses, friction, centurions & center of gravity, moment of inertia: parallel Axes Theorem, 2nd moment of area by integration, principles of strength of material, tension & stress. 3. This course deals with the basic concepts of Dynamics: Kinetics of particle, motion types, normal and tangential component of Acceleration, kinetics: force, mass and acceleration, kinetics of particle Newton's 2nd law.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhancing problem solving in static mechanics including friction, truss, and equilibrium. 2. Enhancing students' analytical abilities by giving an introduction to the principles and basics of oscillatory motion, free vibrations, damped vibrations, forced vibrations, harmonic vibration, the critical speed of rotating shafts, systems of one, two, and multiple degrees of freedom. 3. Ability to use the equation of motion to find the natural frequency. 4. Developing skills in using the Lagrange and Rayleigh equation and the energy method to find the equation of motion. 5. The soft skills objectives of the course.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Statics</u> Force system, unit system, parallelogram law, force components. Moment of couples, Equilibrium: free body and coplanar system. Analysis of trusses. Friction nature of friction, theory of friction, coefficient of friction. [15 hrs]. Centurions & center of gravity, centurions of area Centurions determined by integration, moment of inertia Parallel Axes Theorem, 2nd moment of area by integration Moment of inertia of Composite area Dynamics, Kinetics of particle. [10 hrs] <u>Part B - Dynamics</u> Kinetics of particle, Rectilinear motion, Curvilinear motion Rectangular components of curvilinear motion Normal and tangential component of Acceleration kinetics: force, mass and acceleration kinetics: force, mass and acceleration

	kinetics of particle Newton's 2nd law kinetics of particle Newton's 2nd law. [15 hrs] Part C- Strength of Material. Strength of Materials: Hooks law, tension and compression stress Thin – walled cylinders and spheres Combined stress (Mohr's circle) shear and normal stress Stresses in beams (initial principal). [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	❖ Weekly lectures included Providing students with the basics and topics related to pre-skills education outcomes to solve practical problems through presentation, lecture or conducting experiments. ❖ Solving a group of practical and applied examples by the academic staff. ❖ Through discussion, students participate in solving some practical problems. ❖ The department's practical laboratories are monitored by the department's academic staff. ❖ Asking the student to visit the library and the international information network (the Internet) to obtain additional knowledge of the study subjects. Presenting a seminar (Seminar) by a student in front of his fellow students to enhance his confidence.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects/seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Force system, unit system, parallelogram law, force + components. Moment of couples, Equilibrium: free body diagram, coplanar system
Week 2	Analysis of trusses
Week 3	Friction nature of friction, theory of friction, coefficient of friction
Week 4	Centurions & center of gravity, centurions of area
Week 5	Centurions determined by integration, moment of inertia
Week 6	Parallel Axes Theorem, 2nd moment of area by integration
Week 7	Curvilinear motion Rectangular components of curvilinear motion
Week 8	Normal and tangential component of Acceleration
Week 9	kinetics: force, mass and acceleration
Week 10	kinetics: force, mass and acceleration
Week 11	kinetics of particle Newton's 2nd law
Week 12	kinetics of particle Newton's 2nd law
Week 13	Strength of Materials: Hooks law, tension and compression stress
Week 14	Thin – walled cylinders and spheres
Week 15	Stresses in beams (initial principal)
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics By Higdon	Yes
Recommended Texts	Engineering Mechanics By Meriam	Yes
Websites	https://www.coursera.org/browse/mechanical_engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.