

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Fundamentals of Electrical Engineering (AC)		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	MIET1201		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	2
Administering Department	Medical Devices Technologies	College	Engineering Technologies
Module Leader	Morteza Abbas Imran	e-mail	mortezaabbas@hilla-unc.edu.iq
Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	M.Sc
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	10/3/2026	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamentals of Electrical Engineering (DC)	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand capacitance, inductance and resistance from an AC circuit. 3. To learn the basic concept of First-Order electrical circuits. 4. To explain the parallel and series circuits. 5. To understand Sinusoids and Phasors problems. 6. To perform AC- network theorem. 7. To perform AC Power Analysis. 8. To understand 3-phase system.
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. Describe electrical capacitance, inductance and resistance. 5. Define First-Order electrical circuits' voltage, resistance, and current. 6. Identify the basic circuit elements and their applications. 7. Discuss the operations of sinusoids and phasors in an electric circuit. 8. Discuss the various properties of resistors, capacitors, and inductors. 9. Explain the parallel and series circuits. 10. Identify the capacitor and inductor phasor relationship with respect to voltage and current. 11. Learn the 3-Phase system, Wye connection and Delta connection. 12. Identify the power in balance phase circuit. 13. Describe the Magnetism and Magnetic Circuits
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. AC circuits I – Generation of alternating current, Sinusoidal current. The mean values of current and voltage. [15 hrs] AC Circuits II - The effective values of current and voltage. The vector diagram, [10 hrs] The instantaneous power and mean power of A.C , relative and apparent power . [10 hrs] Revision problem classes [8 hrs] 3-Phase system, Wye connection, and Delta connection [10 hrs] The power in balance phase circuit. [7 hrs] Revision problem classes [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	8% (10)	5, 10	LO #1-4, 6- 9
	Project	1	10% (10)	12	LO # 1-11
	OnSite assignment	2	6% (6)	4, 11	LO # 4, 11
	Report and presentation	1	6% (6)	13	LO # 6, 8, 10
	Lab	5	10% (10)	3, 6, 9, 12, 15	LO # 1-2, 4-5, 7-8, 10-11, 13-14
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	4hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Generation of alternating current, Sinusoidal current
Week 2	Average and RMS values of current & voltage
Week 3	AC in resistive circuits Current & voltage in an inductive circuit
Weeks 4-6	Current and voltage in an capacitive circuits AC series and parallel circuit RL, RC and RLC circuit analysis & phasor representation
Week 7	Mid-term exam
Weeks 8-11	Power in resistive circuits Power in inductive and capacitive circuits Power in circuit with resistance and reactance Measurement of power in a single-phase AC circuit
Week 12-15	Basic concept & advantage of Three-phase circuit Phasor representation of star & delta connection Measurements of power & power factor in 3-phase system Preparation for final exam
Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to electrical elements, sources, and measuring devices related to electrical circuits.
Week 2 + week3	Generating AC Voltages and Measurement Frequency, Period, Amplitude, and Peak Value.
Week 4	Calculations and Verification of the Impedance of RL series circuits
Weeks 5	Calculations and Verification of the current of RL series circuits
Week 6	Calculations and Verification of Impedance RC series circuits + Calculations and Verification of Current RC series circuits
Weeks 7	Mid-term exam
Week 8	Calculations and verification of the impedance of RLC series circuits
Week 9	Calculations and verification of the current of RLC series circuits

Week 10	Calculations of Power in AC Circuits
Week 11	Calculations and verification of the impedance of RL and RC parallel circuits
Week 12	Calculations and verification of the current of RL and RC parallel circuits
Week 13	Calculations and verification of the impedance RLC parallel circuits
Week 14	Calculations and verification of the impedance current RLC parallel circuits
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	Electric Circuits Seventh Edition و Schaum's Outline Series	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.				

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رئيس القسم : أ.د. محمود شاكر نصر

مدرس المادة
م.م مرتضى عباس عمران