

	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Advanced Technologies Department of Refrigeration and Air Conditioning Techniques Engineering	
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering		Module Delivery
Module Type	C	☐ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	HVAC107		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1		
Administering Department	M.SC-HVAC	College	Advanced Technologies
Module Leader	Ahmad Aliwi Samarmad	e-mail	ahmed.ol@uowa.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PHD
Module Tutor	None	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	2026-8-31	Version Number	1

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	NA	Semester	
Co-requisites module	NA	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	1. This is the basic subject for all electrical and electronic circuits. 2. This course deals with the basic concept of electrical 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.
Module Learning Outcomes	Upon completion of the course, students should be able to: 1. Define Ohm's law. 2. List the various terms associated with electrical circuits. 3. Recognize how electricity works in electrical circuits. 4. Describe electrical power, charge, and current. 5. Explain the two Kirchhoff's laws used in circuit analysis. 6. Discuss the various properties of resistors, capacitors, and inductors. 7. Discuss the operations of sinusoid and phasors in an electric circuit. 8. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents	Indicative content includes the following. DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes. [6 hrs]

	Resistive networks, voltage and current sources, Thevenin equivalent circuits, current and voltage division, input resistance, output resistance, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs]				
Learning and Teaching Strategies استراتيجيات التعلم والتعليم					
Strategies	Assessment is based on hand-in assignments, participation in the exercises, classes interactive tutorials, Quizzes and Practical testing				
Student Workload (SWL) الحمل الدراسي للطالب					
Structured SWL (h/sem)		116	Structured SWL (h/w)		8
Unstructured SWL (h/sem)		59	Unstructured SWL (h/w)		6
Total SWL (h/sem)		210			
Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3,5,9,12	LO #1,2,.....10
	Assignments	2	10% (10)	7, 8	LO # 8
	Report/Lab	1	10% (10)	continuous	LO # 11
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-12
	Final Exam	3hr	50% (50)	16	All
Total assessment		100% (100 Marks)			
Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري					
	Material Covered				
Week 1	Resistance, conductance, effect of temp. on the resistance value				
Week 2	Oham’s law, series connection, parallel connection, compound connection				
Week 3	Voltage and current divider solved examples, kirchhoff’s laws				
Week 4	Star-delta conversion examples				
Week 5	Thevenin’s theorem, maximum power transfer				
Week 6	Nodal method, superposition				
Week 7	Alternating voltage and current				
Week 8	Frequency, period, instantaneous value of voltage and current				

Week 9	Component of A.C circuit, pure resistance, pure inductance, pure capacitance
Week 10	Series A.C circuit, R,L,C in series
Week 11	Impedance, phase angle, resonance, phase diagram
Week 12	Parallel A.C circuit, R,L,C, Admittance, power factor
Week 13	Active, reactive, apparent power in A.C circuit
Week 14	3-phase circuit
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Using Multimeter to measure Voltage, Current and Resistance
Week 2	Lab 2: Ohm's law.
Week 3	Lab 3: Voltage and current divider rules
Week 4	Lab 4: Kirchhoff's laws
Week 5	Lab 5: Thevenin's Theorem
Week 6	Lab 6: Series RLC circuit
Week 7	Lab 7: Parallel RLC circuit



Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach, 2020.	No
Websites	https://docs.google.com/file/d/0B_O5jg0LZ_ZXYlg0WVU1bkhrLTg/edit	

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.



استاذ المادة: م. احمد عليوي

التاريخ: 31-8-2026




العميد : ا.م.د علي باسم
محمد

التاريخ : 31-8-2026



رئيس القسم: ا.م.د محمد حسن عبود

التاريخ : 31-8-2026

