

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Circuits		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CET1202		
ECTS Credits	6		
SWL (hr/sem)	180		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Omar Ibrahim Mustafa	e-mail	Omar-ibrahim@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Master's
Module Tutor	Rawaa Abdulridha Kadhim	e-mail	rawaa84ha@mtu.edu.iq
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@yahoo.com
Scientific Committee Approval Date	13/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Engineering Fundamentals	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 Alternating Waveforms (A.C). 2. To understand voltage, current and power from a (A.C) circuit. 3. Deals with the basic concept of electrical (A.C) circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform Thevenin's Norton's Theorem.
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 AC circuits in an electric circuit. 9. Discuss the various properties of resistors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the basic circuit elements, Maximum Power Transfer Theorem and Superposition's method 12. Describe Thevenin's theorem and Norton's theorem and how they work IN AC Circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Definition:</u> - The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms The Alternating Current Network. Ohms law, The Mean Values, The Effective Vales, The Vector Diagram (40 hr) <u>Circuit Theory in (A.C)</u> Ac 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, Series Ac Circuits (R L C), Reviews for Complex Numbers and their mathematical operations (24 hr)

	Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, Conversion Delta To Star Connection, Superposition Method, Maximum Power Transfer Theorem, Superposition's method (24 hr)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This Course Specification prepares the student to be able to realize basic parameters in electrical engineering and how to link these parameters. It also makes him capable of solving electrical circuits using different theorems in addition to utilizing the dc theorems to solve ac circuits. Moreover, it goes into configuring 3 phase circuits, vectors, phase and total powers and to have the student being capable of linking electricity to magnetism

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	88	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	180		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-5 , LO #5-10
	Assignments	2	10% (10)	2, 12	LO # 1- 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 6-11
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-9
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms
Week 2	The Mean Values of Current and Voltage
Week 3	The Effective Vales of Current and Voltage
Week 4	Circuit Elements in the Phasor Domain
Week 5	The Vector Diagram
Week 6	Reviews for Complex Numbers and there mathematical operations
Week 7	Series Ac Circuits (R L C)
Week 8	Parallel Ac Circuits(R L C)
Week 9	The Instantaneous Power and Mean Power of AC, Reactive and Apparent Power
Week 10	Using Kirchhoff's law's to solve AC circuits
Week 11	Using Superposition's method to solve AC circuits
Week 12	Using Thevenin's theorem, to solve AC circuits
Week 13	Using Norton's theorem to solve AC circuits
Week 14	3- Phase Current, 3- Phase System, Y- Connection Delta Connection.
Week 15	Transformers , The hysteresis losses , The eddy current losses

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: How to use measuring devices for alternating circuits (A.C) Osliscope, voltmeter and ammeter
Week 2	Lab 2: how to measure Alternating Waveforms
Week 3	Lab 3: Apply Ohm's Law
Week 4	Lab 4: Series Ac Circuits (R C)
Week 5	Lab 5: Series Ac Circuits (R L)
Week 6	Lab 6: Series Ac Circuits (R L C)
Week 7	Lab 7: Apply Kirchhoff's law to measure voltages
Week 8	Lab 8: Apply Kirchhoff's law to measure current

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	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	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.