MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamental of Electrical Engineering.**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**MIET1101**				
ECTS Credits	**7**				
SWL (hr/sem)	**210**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Zainab Majid Nahi		**e-mail**	Zainab.majid@mtu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSC	
Module Tutor			**e-mail**		
Peer Reviewer Name	**Prof.Dr.Jameel Kaduim Abed** **Ass.Prof.Dr. Ghaidaa Abdulrahman Khalid**		**e-mail**	Dr_ahmed.r@mtu.edu.iq **ghaidaakhalid@mtu.edu.iq**	
Scientific Committee Approval Date	12/06/2023		**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 Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical 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 mesh and Nodal analysis. 7. To perform Loop current method, Super position
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 sinusoids and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current. 12. Discuss the 3-Phase system, Wye connection and Delta connection. 13. Identify the power in balance phase circuit. 14. Describe the Magnetism and Magnetic Circuits
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – DC Circuit Theory I 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. Conversion of delta – connected resistance into an equivalent Wye connection & Vic versa, Network reduction, Introduction to mesh and nodal analysis. [20 hrs]

	Part B – DC-Circuit Theory II Fundamentals of the Power sources connected in parallel, Thevenin and Norton equivalent circuits, current and voltage division, Loop current method, Super position method ,maximum power transfer, Non- linear direct current circuit [20 hrs] 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 . . [15 hrs] Revision problem classes [8 hrs] Magnetism and Magnetic Circuits [20 hrs] 3-Phase system, Wye connection, and Delta connection [15 hrs] The power in balance phase circuit. [10 hrs] Revision problem classes [6 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	102	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	210		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	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	Symbols and abbreviations, Units, Electric circuits, and its elements.
Week 2	The direct–current network (Kirchhoff's law & their use in network).
Week 3	Conversion of delta–connected resistance into an equivalent Wye connection & Vic versa
Week 4	Power sources are connected in parallel,
Week 5	Circuit analysis methods: 1- Node voltage method.2-Loop current method.
Week 6	Circuit analysis Theorems: (Superposition and Thevinens Theorems)

Week 7	Circuit analysis Theorems: (Norton and Maximum power Theorems)
Week 8	Generation of alternating current, Sinusoidal current
Week 9	The mean values of current and voltage.
Week 10	The effective values of current and voltage.
Week 11	The vector diagram.
Week 12	The instantaneous power and mean power of A.C, relative and apparent power.
Week 13	RL transient circuit.
Week 14	RC transient circuit.
Week 15	3-Phase system ,The rotating magnetic field.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to electrical elements, sources, and measuring devices related to electrical circuits.
Week 2	Verification of Ohm's Law
Week 3	Verification of KVL and KCL
Week 4	Verification of Thevenin's and Norton's theorems
Week 5	Verification of the superposition theorem
Week 6	Verification of the maximum power transfer theorem
Week 7	Verification of the Nodal Voltage Theorem
Week 8	Verification of the Mesh Theorem
Week 9	Generating AC Voltages and Measurement Frequency, Period, Amplitude, and Peak Value.
Week 10	Calculations and Verification of the Impedance and Current of RL
Week 11	Calculations and Verification of Impedance and Current RC
Week 12	Calculations and verification of the impedance and current of RLC series circuits
Week 13	Calculations of Power in AC Circuits
Week 14	Calculations and verification of the impedance and current of RL, RC, and RLC parallel circuits
Week 15	Preparatory week before the final exam
Week 16	Preparatory week for the 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 وSchaum's Outline Series	No
Websites	BASIC ELECTRICAL ENGINEERING FOURTH EDITION	

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.