	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al_Anbiyaa Engineering College Department of Biomedical Engineering	

MODULE DESCRIPTOR FORM

Module Information					
Module Title	ELECTRICAL CIRCUITS II			**Module Delivery**	
Module Type	BASIC			☒**Theory** ☒**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	BME-122				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		WBM	**College**	ENG	
Module Leader	Hussein Abdulkareem Saleh		**e-mail**	Hussein.abd@uowa.edu.iq	
Module Leader's Acad. Title		Assistant 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			**Version Number**		1.0

Relation with other Modules			
Prerequisite module	Electrical Circuits I	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes, and Indicative Contents	
Module Aims	1. To develop problem-solving skills and understanding of circuit theory through the application of techniques. 2. To understand AC Principles, general alternating waveforms, sine wave, phasor relations, and average and effective values. 3. This course deals with the alternating principles of electrical circuits. 4. To understand the representation of sinusoidal waveform in domain and time domain. 5. To understand the series RL AC circuit, series RC AC circuit, and series RLC AC circuit 6. To perform series resonance circuits, parallel resonance and parallel quality factor are used.
Module Learning Outcomes	1. Recognize how A.C. electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what A.C. electric circuit means. 4. Discuss the reaction and involvement of resonance in electric circuits. 5. Describe،series RC AC circuit, series RLC AC circuit 6. Define Ohm's law. 7. Identify the basic applications of AC circuits. 8. Discuss the operations of sinusoids and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Identify the capacitor and inductor phasor relationship with respect to voltage and current.

Indicative Contents	Indicative content includes the following. AC Principles, general alternating waveforms, sine wave, phasor relations, average and effective values, complex numbers, representation of sinusoidal waveform in domain and time domain., Series AC Circuits, impedance and phasor diagram: resistor, inductor and capacitor, series RL AC circuit, series RC AC circuit, series RLC AC circuit, voltage divider rule, response of RLC to voltage and current, response of RLC to frequency, Parallel AC Circuits, parallel RL AC circuit, parallel RC AC circuit, parallel RLC AC circuit, AC Power; power triangle and power factor Electrical Circuit Analysis Methods, Mesh Analysis Method, Nodal Analysis Method, bridge networks, star-delta and delta-star circuits conversion, AC Network Theorems, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Resonance, series resonance; series quality factor, selectivity curve and bandwidth frequencies for series resonance circuits, Parallel Resonance, parallel quality factor, Pulse Waveforms and the R-C Response, pulse definition and duty cycle, R-C response to the square wave input., Polyphase Systems (Three-Phase), Transformers, AC Machine.
Learning and Teaching Strategies	
Strategies	The primary strategy for delivering this module will focus on actively engaging students in exercises designed to enhance their critical thinking skills. This will be achieved through a combination of lectures, interactive tutorials, and hands-on experiments featuring engaging and practical activities.

Student Workload (SWL)			
Structured SWL (h/sem)	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem)	57	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	150		

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

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	AC Principles, general alternating waveforms, sine wave.
Week 2	Phasor relations, average and effective values.
Week 3	Complex numbers.
Week 4	Representation of sinusoidal waveform in frequency domain and time domain.
Week 5	Series AC Circuits, impedance and phasor diagram: resistor, inductor and capacitor, series RL AC circuit, series RC AC circuit.
Week 6	Series RLC AC circuit, voltage divider rule, response of RLC to voltage and current, response of RLC to frequency.
Week 7	Mid-term Exam
Week 8	Parallel AC Circuits, parallel RL AC circuit, parallel RC AC circuit, parallel RLC AC circuit AC Power; power triangle and power factor .
Week 9	Electrical Circuit Analysis Methods, Mesh Analysis Method, Nodal Analysis Method.
Week 10	AC Network Theorems, Superposition Theorem, Thevenin's Theorem, Norton's Theorem.
Week 11	Resonance, series resonance..
Week 12	Series quality factor, selectivity curve and bandwidth frequencies for series resonance circuits.
Week 13	Parallel Resonance, parallel quality factor,
Week 14	Series magnetic circuit
Week 15	**Parallel magnetic circuit**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Introduction to AC circuit
Week 2	Lab 2: RL series AC circuit
Week 3	Lab 3: RC series AC circuit
Week 4	Lab 4: RLC series AC circuit
Week 5	Lab 5: RLC parallel AC circuit
Week 6	Lab 6: series resonance AC circuit
Week 7	Lab 7: parallel resonance AC circuit

Learning and Teaching Resources		
	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			
Group	**Grade**	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	90 - 100	Outstanding Performance
	B - Very Good	80 - 89	Above average with some errors
	C - Good	70 - 79	Sound work with notable errors
	D - Satisfactory	60 - 69	Fair but with major shortcomings
	E - Sufficient	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	(45-49)	More work required but credit awarded
	F – Fail	(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.