

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Fundamentals of Electrical Engineering (AC)		
Module Type	Core		
Module Code	UOMU024021		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	2
Administering Department	MIET	College	EETC
Module Leader	Zeyad Taha Yaseen	e-mail	Zeyad.Taha.yaseen@uomus.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	PHD
Module Tutor	Zeyad Taha Yaseen	e-mail	Zeyad.Taha.yaseen@uomus.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	19/11/2023	Version Number	1.0

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

### Module Aims, Learning Outcomes and Indicative Contents

## أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Aims</b> <b>أهداف المادة الدراسية</b>	<ol style="list-style-type: none"> <li>1. To develop problem solving skills and understanding of circuit theory through the application of techniques.</li> <li>2. To understand capacitance, inductance and resistance from an AC circuit.</li> <li>3. To learn the basic concept of First-Order electrical circuits.</li> <li>4. To explain the parallel and series circuits.</li> <li>5. To understand Sinusoids and Phasors problems.</li> <li>6. To perform AC- network theorem.</li> <li>7. To perform AC Power Analysis.</li> <li>8. To understand 3-phase system.</li> </ol>
<b>Module Learning Outcomes</b> <b>مخرجات التعلم للمادة الدراسية</b>	<ol style="list-style-type: none"> <li>1. Recognize how electricity works in electrical circuits.</li> <li>2. List the various terms associated with electrical circuits.</li> <li>3. Summarize what is meant by a basic electric circuit.</li> <li>4. Describe electrical capacitance, inductance and resistance.</li> <li>5. Define First-Order electrical circuits' voltage, resistance, and current.</li> <li>6. Identify the basic circuit elements and their applications.</li> <li>7. Discuss the operations of sinusoids and phasors in an electric circuit.</li> <li>8. Discuss the various properties of resistors, capacitors, and inductors.</li> <li>9. Explain the parallel and series circuits.</li> <li>10. Identify the capacitor and inductor phasor relationship with respect to voltage and current.</li> <li>11. Learn the 3-Phase system, Wye connection and Delta connection.</li> <li>12. Identify the power in balance phase circuit.</li> <li>13. Describe the Magnetism and Magnetic Circuits</li> </ol>
<b>Indicative Contents</b> <b>المحتويات الإرشادية</b>	<p>Indicative content includes the following.</p> <p>AC circuits I – Generation of alternating current, Sinusoidal current. The mean values of current and voltage. [15 hrs]</p> <p>AC Circuits II - The effective values of current and voltage. The vector diagram, [10 hrs]</p> <p>The instantaneous power and mean power of A.C , relative and apparent power . . [10 hrs]</p> <p>Revision problem classes [8 hrs]</p> <p>3-Phase system, Wye connection, and Delta connection [10 hrs]</p> <p>The power in balance phase circuit. [7 hrs]</p> <p>Revision problem classes [5 hrs]</p>

## Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

<b>Strategies</b>	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

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	79	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	5
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
<b>Total SWL (h/sem)</b> 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
<b>Total assessment</b>		100% (100 Marks)			

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	<b>Material Covered</b>
<b>Week 1</b>	Generation of alternating current, Sinusoidal current
<b>Week 2</b>	Average and RMS values of current & voltage
<b>Week 3</b>	AC in resistive circuits Current & voltage in an inductive circuit
<b>Weeks 4-6</b>	Current and voltage in an capacitive circuits AC series and parallel circuit RL, RC and RLC circuit analysis & phasor representation
<b>Week 7</b>	Mid-term exam
<b>Weeks 8-11</b>	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
<b>Week 12-15</b>	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)

المنهاج الاسبوعي للمختبر

	<b>Material Covered</b>
<b>Week 1</b>	Introduction to electrical elements, sources, and measuring devices related to electrical circuits.
<b>Week 2 + week3</b>	Generating AC Voltages and Measurement Frequency, Period, Amplitude, and Peak Value.
<b>Week 4</b>	Calculations and Verification of the Impedance of RL series circuits
<b>Weeks 5</b>	Calculations and Verification of the current of RL series circuits
<b>Week 6</b>	Calculations and Verification of Impedance RC series circuits + Calculations and Verification of Current RC series circuits
<b>Weeks 7</b>	Mid-term exam
<b>Week 8</b>	Calculations and verification of the impedance of RLC series circuits
<b>Week 9</b>	Calculations and verification of the current of RLC series circuits
<b>Week 10</b>	Calculations of Power in AC Circuits

<b>Week 11</b>	Calculations and verification of the impedance of RL and RC parallel circuits
<b>Week 12</b>	Calculations and verification of the current of RL and RC parallel circuits
<b>Week 13</b>	Calculations and verification of the impedance RLC parallel circuits
<b>Week 14</b>	Calculations and verification of the impedance current RLC parallel circuits
<b>Week 15</b>	Final exam

<b>Learning and Teaching Resources</b> مصادر التعلم والتدریس		
	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
<b>Recommended Texts</b>	Electric Circuits Seventh Edition و Schaum's Outline Series	No
<b>Websites</b>		

<b>Grading Scheme</b> مخطط الدرجات				
<b>Group</b>	<b>Grade</b>	التقدير	<b>Marks (%)</b>	<b>Definition</b>
<b>Success Group (50 - 100)</b>	<b>A - Excellent</b>	امتياز	90 - 100	Outstanding Performance
	<b>B - Very Good</b>	جيد جدا	80 - 89	Above average with some errors
	<b>C - Good</b>	جيد	70 - 79	Sound work with notable errors
	<b>D - Satisfactory</b>	متوسط	60 - 69	Fair but with major shortcomings
	<b>E - Sufficient</b>	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 - 49)</b>	<b>FX – Fail</b>	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F – Fail</b>	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.