

## MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Circuits		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	UOMU0202022		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	CET	College	EETC
Module Leader	Zahraa Hazim Obaid	e-mail	zahraa.hazim@uomus.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	29/10/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOMU022012	Semester	1
Co-requisites module	None	Semester	

<b>Module Aims, Learning Outcomes and Indicative Contents</b> <b>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</b>	
<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 Alternating Waveforms (A.C).</li> <li>2. To understand voltage, current and power from a (A.C) circuit.</li> <li>3. Deals with the basic concept of electrical (A.C) circuits.</li> <li>4. This is the basic subject for all electrical and electronic circuits.</li> <li>5. To understand Kirchhoff's current and voltage Laws problems.</li> <li>6. To perform Thevenin's Norton's Theorem.</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. Discuss the reaction and involvement of atoms in electric circuits.</li> <li>5. Describe electrical power, charge, and current.</li> <li>6. Define Ohm's law.</li> <li>7. Identify the basic circuit elements and their applications.</li> <li>8. Discuss the operations of AC circuits in an electric circuit.</li> <li>9. Discuss the various properties of resistors.</li> <li>10. Explain the two Kirchhoff's laws used in circuit analysis.</li> <li>11. Identify the basic circuit elements, Maximum Power Transfer Theorem and Superposition's method</li> <li>12. Describe Thevenin's theorem and Norton's theorem and how they work IN AC Circuits.</li> </ol>
<b>Indicative Contents</b> <b>المحتويات الإرشادية</b>	<p>Indicative content includes the following.</p> <p><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.</p> <p>Ohms law, The Mean Values, The Effective Values, The Vector Diagram <b>(40 hr)</b></p> <p><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</p>

	<p>and Ohm's law. Anatomy of a circuit, Network reduction, Series Ac Circuits (R L C), Reviews for Complex Numbers and their mathematical operations <b>(24 hr)</b></p> <p><u>Fundamentals</u></p> <p>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 <b>(24 hr)</b></p>
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### Learning and Teaching Strategies

#### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<p>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</p>
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### Student Workload (SWL)

#### الحمل الدراسي للطالب

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	64	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.733
<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
<b>Formative assessment</b>	Quizzes	1	5% (5)	8	LO #1-4
	Assignments	1	5% (5)	14	LO # 1- 11
	Projects / Lab.	10	20% (10)	Continuous	
	Report	10	10% (10)	12	LO # 1-12
	Midterm Exam	2 hr	10% (10)	8	LO # 1-9

<b>Summative assessment</b>	<b>Final Exam</b>	4hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

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

### Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	Lab 1: How to use measuring devices for alternating circuits (A.C) Oslicope, voltmeter and ammeter
<b>Week 2</b>	Lab 2: how to measure Alternating Waveforms
<b>Week 3</b>	Lab 3: Apply Ohm's Law
<b>Week 4</b>	Lab 4: Series Ac Circuits (R C)
<b>Week 5</b>	Lab 5: Series Ac Circuits (R L)
<b>Week 6</b>	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	<a href="https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</a>	

<b>Grading Scheme</b> <b>مخطط الدرجات</b>				
Group	Grade	التقدير	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 – 49)</b>	<b>FX</b> – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F</b> – Fail	راسب	(0-44)	Considerable amount of work required
<b>Note:</b> 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.				