



الملحق ٤: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Fundamentals of Electrical Circuits I</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>CPE 103</b>		
ECTS Credits	6		
SWL (hr/sem)	<b>150</b>		
Module Level	1	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Siraj Manhal Hameed	e-mail	sirajmanhal@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Ali N. Abu-Rghaif	e-mail	ali.alb-Rghaif@uodiyala.edu.iq
Scientific Committee Approval Date	10/06/2023	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

<p><b>Module Objectives</b> أهداف المادة الدراسية</p>	<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 Temperature effect of the resistance</li> <li>3. To understand Ohm's law</li> <li>4. To understand series and parallel connections. Also, the Delta-Star Transformation</li> <li>5. To understand voltage, current and power from a given circuit.</li> <li>6. This course deals with the basic concept of electrical circuits.</li> <li>7. This is the basic subject for all electrical and electronic circuits.</li> <li>8. To understand Kirchhoff's current and voltage Laws problems.</li> <li>9. To perform Superposition, Thevenin and Norton Theorems with Mesh and Nodal analysis.</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Recognize how electricity works in electrical circuits and Summarize what is temperature effect of the resistance.</li> <li>2. Define Ohm's law and Describe electrical power, charge, and current.</li> <li>3. Identify the basic circuit elements and Distinguish between series and parallel connections.</li> <li>4. Explain the two Kirchhoff's laws (Voltage &amp; Current) used in circuit analysis.</li> <li>5. Explain Delta &amp; Star connections with (Delta to Star) &amp; (Star to Delta) Transformation.</li> <li>6. Explain the theorems that utilize in circuit analysis.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p><b>Indicative content includes the following.</b></p> <p><u>Part A - Resistance</u> Circuit elements, Resistance of the material, Temperature Effects. [3 hrs]</p> <p><u>Part B - Ohm's law</u> Ohm's law, Resistor in series, Resistor in parallel, Kirchhoff's voltage law, Kirchhoff's current law, Delta connection. Star connection, Delta to Star Transformation. Star to Delta Transformation, Current and Voltage Sources. [24 hrs]</p> <p><u>Part C - Circuit Analysis and Theorems</u> The principle of Superposition, The Thevenin equivalent circuit, The Norton equivalent circuit, Maximum power transfer, The Node Voltage Method, The Mesh Current Method. [18 hrs]</p>



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### 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, homework's and examples. Practical examples helps students to understand the course material.
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### Student Workload (SWL)

#### الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	<b>79</b>	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	<b>5</b>
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	<b>71</b>	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	<b>4.5</b>
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	<b>150</b>		

### Module Evaluation

#### تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	Quizzes	2	10% (10)	6 and 12	LO #1 to #4 and #5 to #6
	Assignments	2	10% (10)	3 and 12	LO #2, #3 and #4 to #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #6
<b>Summative assessment</b>	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
<b>Total assessment</b>			<b>100% (100 Marks)</b>		



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### Delivery Plan (Weekly Syllabus)

#### المنهاج الاسبوعي النظري

	Material Covered
<b>Week 1</b>	Temperature effect of the resistance
<b>Week 2</b>	Ohm's law
<b>Week 3</b>	Resistor in series
<b>Week 4</b>	Resistor in parallel
<b>Week 5</b>	Kirchhoff 's voltage law
<b>Week 6</b>	Kirchhoff 's current law
<b>Week 7</b>	Delta and Star connection
<b>Week 8</b>	(Delta to Star) and (Star to Delta) Transformation
<b>Week 9</b>	Current and Voltage Sources
<b>Week 10</b>	The principle of Superposition
<b>Week 11</b>	The Thevenin equivalent circuit
<b>Week 12</b>	The Norton equivalent circuit
<b>Week 13</b>	Maximum power transfer
<b>Week 14</b>	The Node Voltage Method
<b>Week 15</b>	The Mesh Current Method
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

#### المنهاج الاسبوعي للمختبر

	Material Covered
<b>Week 1</b>	DC Voltage & current Measurement
<b>Week 2</b>	Using an Ohmmeter & Resistor Characteristics
<b>Week 3</b>	Ohm's Law
<b>Week 4</b>	Power in DC Circuit
<b>Week 5</b>	Series Circuits
<b>Week 6</b>	Parallel Circuits



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<b>Week 7</b>	Combined Series-Parallel Circuits
<b>Week 8</b>	Kirchhoff's voltage Law
<b>Week 9</b>	Kirchhoff's current Law
<b>Week 10</b>	Superposition Theorem
<b>Week 11</b>	Thevenin's Theorems
<b>Week 12</b>	Norton's Theorems
<b>Week 13</b>	Maximum Power Transfer Theorem
<b>Week 14</b>	The Node Voltage Method
<b>Week 15</b>	The Mesh Current Method

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 7th or 10th or 11th Edition.	Yes
<b>Recommended Texts</b>	<ul style="list-style-type: none"> <li>• Charles K. Alexander and Matthew N. O. Sadiku, Fundamentals of Electric Circuits, McGrawHill, fourth edition, 2009.</li> <li>• Behzad Razavi, <i>Fundamentals of Microelectronics</i>, John Wiley &amp; Sons, Preview Edition, 2006</li> <li>• J J Kathy and SA Naser, fundamental of Electrical Engineering, Schaum's outline, Academia International, 2004.</li> <li>• Any other materials available on the web.</li> </ul>	No
<b>Websites</b>	<a href="https://www.youtube.com/playlist?list=PLHCD1a8slQtJbEKJawJL9gQaY5P9SgCUX">https://www.youtube.com/playlist?list=PLHCD1a8slQtJbEKJawJL9gQaY5P9SgCUX</a>	



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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.