

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	<b>Electrical Engineering Fundamentals I</b>		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	<b>EE 101</b>		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Name: Yasir Ghazi Rashid	e-mail	E-mail: yasserghazee_eng@uodiyala.edu.iq
Module Leader's Acad. Title	Asst. Lect.	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	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. This course deals with the basic concept of electrical circuits.</li> <li>2. This is the basic subject for all electrical and electronic circuits.</li> <li>3. To understand voltage, current and power from a given circuit.</li> <li>4. To develop problem solving skills and understanding of circuit theory through the application of techniques.</li> <li>5. To understand Kirchhoff's current and voltage Laws problems.</li> <li>6. To perform 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.</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 sinusoid and phasors in an electric circuit.</li> <li>9. Discuss the various properties of resistors, capacitors, and inductors.</li> <li>10. Explain the two Kirchhoff's laws used in circuit analysis.</li> <li>11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.</li> </ol>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b><u>Part A - Basic Concepts</u></b> Introduction, Systems of Units, Charge and Current, Voltage, Power and Energy, Circuit Elements [18 hrs]</p> <p><b><u>Part B - Basic Laws</u></b> Ohm's Law, Nodes, Branches, and Loops, Kirchhoff's Laws, Series Resistors and Voltage Division, Parallel Resistors and Current Division, Wye-Delta Transformations. [15 hrs]</p> <p><b><u>Part C - Methods of Analysis</u></b> Nodal Analysis, Nodal Analysis with Voltage Sources, Mesh Analysis, Mesh Analysis with Current Sources [12 hrs]</p> <p><b><u>Part D - Circuit Theorems</u></b> Superposition, Source Transformation, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer [24 hrs] Revision problem classes [6 hrs]</p>

## Learning and Teaching Strategies

### استراتيجيات التعلم والتعليم

<b>Strategies</b>	<p><b>1. Behavior management</b> Behavior management strategies foster an atmosphere of mutual respect, reduce disruptive behavior and ensure students have an equal opportunity to fulfill their potential in the classroom. It's crucial to provide them with both a positive and productive learning environment. Examples include establishing a reward system with an interactive chart where students move up or down depending on their performance and behavior in class.</p> <p><b>2. Blended learning</b> With a blended learning teaching strategy, technology is incorporated with traditional learning. This allows students to work at their own pace, research their ideas and become more physically engaged during lessons. Examples include providing interactive tablets or whiteboards with engaging activities and posting classwork online for easier access.</p> <p><b>3. Cooperative learning</b> Group work is a cooperative learning strategy that allows students with various learning levels to work together. By encouraging them to express their own ideas and listen to others' ideas as a group, you help students develop communication and critical thinking skills. Examples include solving math puzzles together, performing skits as a team or working on group presentations.</p> <p><b>4. Formative assessment</b> A formative assessment is used periodically to monitor student learning incrementally. This can more effectively measure the process of learning as opposed to end-of-unit tests and can help you to improve your teaching methods throughout the year. Examples of this teaching strategy include self-evaluation exercises and summarizing a topic in multiple ways.</p> <p><b>5. Student-led teaching</b> The student-led teaching strategy lets students become the teacher. In a classroom with learners at different levels, you can better engage those learning faster by showing them how to teach and give feedback to their peers. They may team-teach or work in groups to teach a new topic. Examples include letting a student teach an entire lesson or having advanced writers lead a peer-editing session as well as provide constructive criticism.</p>
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## Student Workload (SWL)

### الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	109	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعيا	7
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	<b>200</b>		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 12	LO #1, #4 and #8, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #10, #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	8	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	<ul style="list-style-type: none"> <li>Electrical Engineering: An Overview</li> </ul>
Week 2	<ul style="list-style-type: none"> <li>The International System of Units conversions (metric prefixes)</li> <li>Free electrons, electric charge &amp; types of electric materials</li> <li>Definition of: electric current, electric current flowing through a conductor</li> </ul>
Week 3	<ul style="list-style-type: none"> <li>Definition of electric voltage</li> <li>Polarity of electric voltage across an element</li> <li>The difference between electric potentials and electric voltage</li> <li>Linear elements: resistances, conductance, capacitances, and inductances</li> <li>Definition of: Power and energy, Sources (Independent Source &amp; Dependent Source)</li> </ul>
Week 4	<ul style="list-style-type: none"> <li>Ohm's Law</li> <li>Definition of: Nodes, Branches, and Loops</li> </ul>
Week 5	<ul style="list-style-type: none"> <li>Series &amp; parallel connections of resistors</li> <li>Series Resistors and Voltage Division</li> <li>Parallel Resistors and Current Division</li> </ul>
Week 6	<ul style="list-style-type: none"> <li>Short and Open Circuits</li> </ul>

	<ul style="list-style-type: none"> <li>Wye-Delta Transformations</li> </ul>
<b>Week 7</b>	Kirchhoff's Laws
<b>Week 8</b>	<b>Mid-term Exam</b>
<b>Week 9</b>	Methods of Analysis: Nodal Analysis
<b>Week 10</b>	Methods of Analysis: Mesh Analysis
<b>Week 11</b>	Circuit Theorems: Superposition, Source Transformation
<b>Week 12</b>	Circuit Theorems: Source Transformation
<b>Week 13</b>	Circuit Theorems: Thevenin's Theorem
<b>Week 14</b>	Circuit Theorems: Norton's Theorem, Derivations of Thevenin's and Norton's Theorems
<b>Week 15</b>	Circuit Theorems: Maximum Power Transfer Theorem
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	<b>Material Covered</b>
<b>Week 1</b>	Lab 1: Introduction to Lab. Equipment's
<b>Week 2</b>	Lab 2: How to measure DC Voltage with a voltmeter (analog and digital)
<b>Week 3</b>	Lab 3: How to measure DC Current with an ammeter (analog and digital)
<b>Week 4</b>	Lab 4: How to measure Resistor with an ohmmeter (analog and digital)
<b>Week 5</b>	Lab 5: How to measure power with a wattmeter (analog and digital)
<b>Week 6</b>	Lab 6: How to use Avometer
<b>Week 7</b>	Lab 7: Resistor Color Code
<b>Week 8</b>	Lab 8: Ohm's Law
<b>Week 9</b>	Lab 9: Series, parallel and series- parallel circuits
<b>Week 10</b>	Lab 10: Wye-Delta Transformations
<b>Week 11</b>	Lab 11: Kirchhoff's Voltage and Current Laws
<b>Week 12</b>	Lab 12: Superposition theorems
<b>Week 13</b>	Lab 13: Thevenin's & Norton's theorems
<b>Week 14</b>	Lab 14: Maximum Power Transfer Theorem
<b>Week 15</b>	<b>Final Exam</b>

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	<ul style="list-style-type: none"> <li>• Theraja, B. L. <b>A Textbook of Electrical Technology- Volume I (Basic Electrical Engineering)</b>. Vol. 1. S. Chand Publishing, 2005.</li> <li>• C.K. Alexander and M.N.O Sadiku, <b>Fundamentals of Electric Circuits</b>, McGraw-Hill Education, Fifth Edition, 2013</li> </ul>	Yes
<b>Recommended Texts</b>	<ul style="list-style-type: none"> <li>• Allan H. Robbins and Wilhelm C. Miller, <b>Circuit analysis: Theory and practice</b>, Cengage Learning, Fifth Edition, 2013.</li> <li>• Nilsson, James William, <b>Electric circuits</b>, Pearson Education India, 2008.</li> </ul>	No
<b>Websites</b>	<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>	

Grading Scheme				
مخطط الدرجات				
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
<p><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.</p>				