

## MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

**Fundamentals of Electricity (IUC00102)** اساسيات الكهرباء

**1<sup>st</sup> Semester** الفصل الاول

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering Fundamentals	Module Delivery	
Module Type	C	<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	CET1102		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1		
Administering Department	CET	College	IUC
Module Leader	Prof. Hamza Al-Sewadi	e-mail	<a href="mailto:hamza.ali@iuc.edu.iq">hamza.ali@iuc.edu.iq</a>
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr Saar Jawad	e-mail	
Peer Reviewer Name	Prof. Hamza Al-Sewadi	e-mail	Prof. Hamza Al-Sewadi
Scientific Committee Approval Date	10/07/2023	Version Number	1

Module Descriptions
وصف المادة
Explore the basics of electricity and learn its laws, theorems and how the DC circuit works in this free online course. The history of electricity is fascinating and you find it in nature and the latest technology. This course explains how early scientists came up with laws and theorems such as Ohm's law, Norton's theorem and more. We examine the basic concepts of the DC circuit and how to apply them in modern life. You'll learn about electrical components such as resistors, capacitors, etc., and how to calculate voltage and current across DC circuits.

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	NoneNone	Semester	
Co-requisites module		Semester	

**Module Aims, Learning Outcomes and Indicative Contents**

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<b>Module Objectives</b> أهداف المادة الدراسية	<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 voltage, current, and power from a given circuit.</li><li>3. This course deals with the basic concept of electrical circuits.</li><li>4. This is the basic subject for all electrical and electronic circuits.</li><li>5. To understand Kirchoff's current and voltage Law problems.</li><li>6. To perform Thevenin's Norton's Theorem.</li></ol>
<b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية	<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 DC circuits in an electric circuit.</li><li>9. Discuss the various properties of resistors.</li><li>10. Explain the two Kirchoff's laws used in circuit analysis.</li><li>11. Identify the basic circuit elements, Maximum Power Transfer Theorem and Reciprocity Theorem.</li><li>12. Describe Thevenin's theorem and Norton's theorem and how they work</li></ol>
<b>Indicative Contents</b> المحتويات الإرشادية	<ol style="list-style-type: none"><li>1- Definition: Symbols and Abbreviations, Units, Electric Circuit &amp; Its Element. The Direct Current Network. , Ohms low, Charge, Force, Work, Power. ( 20 hr)</li><li>2- -Circuit Theory: DC circuits – Current and voltage definitions, Passive sign convention, and circuit elements, Combining resistive elements in series and parallel. Kirchoff's laws and Ohm's laws. Anatomy of a circuit, Network reduction (20 hr)</li><li>3- 3-Revision problem classes :</li><li>4- Resistive networks, voltage, and current sources, Thevenin and Norton equivalent circuits, Conversion Delta To Star Connection, Superposition Method, Maximum Power Transfer Theorem, Reciprocity Theorem ( 20 hr)</li></ol>

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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 للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5.73
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
Assessment		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	8	LO #1 -4
	Assignments	1	10% (10)	6	LO #1-11
	Lab.	8	20% (20)	Continuous	All
	Report	1	5% (5)	12	LO # 6-11
Summative assessment	Midterm Exam	2hr	10% (10)	10	LO #1 -9
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Symbols and abbreviations

<b>Week 2</b>	The direct current networks, Ohm law
<b>Week 3 &amp; 4</b>	Series Circuits (Resistance in Series) Voltage Divider Rule
<b>Week 5</b>	Parallel Circuits(Resistances in Parallel) Current Divider Rule.
<b>Week 6</b>	Open and Short Circuits, Source Transformation
<b>Week 7</b>	Series-Parallel Circuits Transformation
<b>Week 8</b>	Kirchhoff's Laws: - Kirchhoff's current law (KCL) and. Their Use In Network Analysis.
<b>Week 9</b>	Kirchhoff's voltage law (KVL).and Their Use In Network Analysis
<b>Week 10</b>	Midterm exam
<b>Week 11</b>	Conversion Delta To Star Connection And Conversion Star To Delta Connection,
<b>Week 12</b>	Superposition Method,
<b>Week 13</b>	Thevenin's Theorem, Norton's Theorem
<b>Week 14</b>	Maximum Power Transfer Theorem
<b>Week 15</b>	Reciprocity Theore

### Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

<b>Week</b>	<b>Material Covered</b>
<b>Week 1</b>	How to use ammeter, voltmeter and ohmmeter
<b>Week 2</b>	Apply Ohm's Law
<b>Week 3</b>	Apply Kirchhoff's law to measure current
<b>Week 4</b>	Apply Kirchhoff's law to measure voltage
<b>Week 5</b>	Superposition Method
<b>Week 6</b>	Norton's Theorem. Lab
<b>Week 7</b>	Thevenin's Theorem
<b>Week 8</b>	Delta To Star Connection And Conversion Star To Delta Connection

### Learning and Teaching Resources

مصادر التعلم والتدريس

	<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>	1. DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents. 2. Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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>	

<b>Grading Scheme</b> مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
<b>Success Group</b> (50 - 100)	<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</b> (0 – 49)	<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

**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.