MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><th colspan="5">Module Information
معلومات المادة الدراسية</th></tr>
<tr><td>Module Title</td><td colspan="2"><strong style="color:red">Electrical Circuits Analysis</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2">B</td><td colspan="2" rowspan="4">☒Theory
☐ Lecture
☒Lab
☒Tutorial
☒Practical
☐Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2"><strong style="color:red">ELCA111</td></tr>
<tr><td>ECTS Credits</td><td colspan="2">7</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2"><strong style="color:red">175</td></tr>
<tr><td>Module Level</td><td>UG1</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>DR. Nihad Ibrahim Abbas</td><td>e-mail</td><td colspan="2">Nihad.I.abbas@uotechnology.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Lecturer</td><td>Module Leader's Qualification</td><td colspan="2">Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Dr. Saddam Kamil Alwane</td><td>e-mail</td><td colspan="2">Saddam.K,Alwane@uotechnology.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td></td><td>Version Number</td><td colspan="2"></td></tr>
</table>

<table>
<tr><th colspan="3">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</th></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
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Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the concepts of basic electrical elements, sources, and electrical network configurations. Also, to understand how the electrical elements such as resistors, capacitors, and inductors are construct a simple and complex electrical network configuration 2. To develop problem solving skills through different solving techniques. 3. The course deals with the basic concept of electrical circuit theories, rules methods analysis (Ohm Law, Kirchhoff's Laws, Thevenin, Norton, Superposition, Mesh analysis, maximum power transfer, etc.)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning standard measurement units used in electrical networks, 2. study the nature of electricity of materials in term of conductivity and resistivity of materials and how it divided into the conductor, insulator, and semiconductor elements. 3. Define electrical power, charge, voltage, current, resistors, capacitors, inductors, and electrical energy. 4. Study and analysis different types of circuit connections (series, parallel, delta, star, and complex configuration). 5. Discuss dependent and independent electrical source (voltage and current). 6. Define Ohm's law and explain its importance in electric and electronic circuit analysis. 7. Explain Kirchhoff voltage law (KVL) and Kirchhoff current law (KCL) that it is used in electric network analysis. 8. Study and explain in details various theorems and techniques used in electrical circuit analysis (superposition, Nodal analysis, Mesh, Thevenin, Norton theorem, and maximum power transfer) 9. study capacitor sand inductors properties and their circuit configurations. 10. Discuss alternating current and voltage waveforms AC sinusoidal waveforms in term of mean, effective values and phasors diagrams in an electric circuit. 11. Repeat various techniques used in solving electrical circuits exceed by ac sources.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. DC part: standard units used in electrical circuits, Charge, Current and voltage definitions, Passive electric components (R, C, and L), series and parallel connections, sources conversions. [20 hrs.] Della to star and star to delta conversion, Ohm's law, power, energy, and Kirchhoff's laws. [20]

| | Methods of analysis (Source Conversions, Mesh analysis, Nodal analysis, superposition theorem, Thévenin's theorem, Norton's Theorem, and maximum power transfer theorem) [30].

Capacitors and Inductors (introduction, properties, and configurations) [10 hrs.]

AC part: Sinusoidal Ac Voltage Characteristics and Definitions, average value, effective value (rms value). [10 hrs.]

Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [20 hrs.]

AC Circuits II - Phasor diagrams, complex impedance, AC circuit with complex numbers. [10 hrs.]

Series-Parallel Ac Networks, Methods of Analysis of AC networks (Source Conversions, Mesh analysis, Nodal analysis, superposition theorem, Thévenin's theorem, Norton's Theorem, and maximum power transfer theorem) [20 hrs.]

Revision problem class [10hrs]

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Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	Teaching strategies adopted in electrical circuit analysis class encourage students to understanding basic electrical components (R, C, and L) properties and electric ac and dc sources used in supplying different electric networks. Also, expanding their problem solving skills. Also, help them to improve skills in discovering electrical systems fault diagnosis. 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 محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	100	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3

Total SWL (h/sem) 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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	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	Electrical Circuit Elements And Variables
Week 2	Ohm's law, electrical power, energy, and efficiency
Week 3	Resistance Series and Parallel Networks. Current and Voltage Divider Rules.
Week 4	Kirchhoff's Laws (KVL and KCL)
Week 5	Sources Conversions and Δ To Y Transformations
Week 6	Loop Current Method (Mesh Analysis) and Nodal Analysis
Week 7	Thévenin's and Norton's Theorems
Week 8	Superposition Theorem
Week 9	Maximum Power Transfer Theorem
Week 10	Introduction to Sinusoidal Ac Waveforms (Characteristics and Definitions).
Week 11	Average and Rms Waveforms Values. Response of Basic R, L, And C Elements to A Sinusoidal Voltage Or Current.
Week 12	Series and Parallel Ac Circuits and Power Factor
Week 13	Methods of AC circuit analysis I

Week 14	Methods of AC circuit analysis II
Week 15	Inductor and capacitor circuits
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Lab 1: resistance measurement (color code and mustimeter method)
Week 2	Lab 2: Ohms Law
Week 3	Lab 3: Resistance Series and Parallel Networks.
Week 4	Lab 4: Kirchhoff's Laws (KVL and KCL).
Week 5	Lab 5: Δ To Y Transformations
Week 6	Lab 6: Superposition Theorem
Week 7	Lab 7:Thévenin's Theorems.
Week	Lab 8: Norton's Theorems.
Week 9	Lab 9:Maximum Power Transfer Theorem
Week 10	Lab 10:Characteristics of Sinusoidal Ac Waveforms
Week 11	Lab 11: Series and Parallel Ac Circuits
Week12	Lab12: Series and Parallel Capacitors.
Week13	Lab13: Series and Parallel Inductor Circuits
Week14	Lab14: Transient in Capacitance Networks and Time Constant
Week15	Lab15: R-L Transient and Time Constant

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	R.L, Boylestad " Introductory Circuit analysis 5th edition. Merrill publishing company	Yes
Recommended Texts	Charles Alexander, "Fundamentals of Electric Circuits" 5TH Edition, Publisher: McGraw-Hill Publishing Company, 2013.	yes
Websites	https://www.coursera.org/browse/physical-sience-and-engineering/electronic	

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.