

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Circuits Analysis تحليل الدوائر الكهربائية		Module Delivery
Module Type	Core (C)		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CS111		
ECTS Credits	6		
SWL (hr./sem)	150		
Module Level	UGI	Semester of Delivery	1
Administering Department	Department of Communications and Intelligent Digital Systems Engineering	College	Engineering
Module Leader	Asst. Prof. Dr. Mohammad T. Yaseen	e-mail	mtyaseen@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Doctor
Module Tutor	Dr. Marwan A. Thnoon	e-mail	marwanathy1972@uomosul.edu.iq
Peer Reviewer Name	Asst. Prof. Dr. Saad Ahmed Ayoub	e-mail	sa_ah_ay@uomosul.edu.iq
Scientific Committee Approval Date	1/1/2026	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>Module Aims</p> <p>أهداف المادة الدراسية</p>	<p>(Theory)</p> <ol style="list-style-type: none"> 1. To develop problem solving skills and understanding of DC circuit theory through the application of techniques. 2. To understand voltage, current and power from a given DC circuit. 3. This course deals with the basic concept of DC electrical circuits. 4. This is the basic subject for all DC electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis. 7. To perform Thevenin and superposition theory. <p>(LAB):</p> <ol style="list-style-type: none"> 8. To handle laboratory equipment and electrical elements professionally and scientifically. 9. To analyze electrical circuits and comprehend their operational principles. 10. To cultivate a scientific mindset in the student by interpreting practical results based on theoretical concepts. 11. To enhance the student's capability to design basic electronic circuits in accordance with their scientific aptitude. 12. To analyze and simulate circuit processes using various software tools on electronic calculators and compare the analysis results with practical outcomes.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>(Theory):</p> <ol style="list-style-type: none"> 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Describe electrical voltage, current and power. 5. Define Ohm's law. 6. Identify the basic circuit passive and active elements and their applications. 7. Discuss the various properties of resistors. 8. Explain the two Kirchhoff's laws used in circuit analysis. 9. Explain the Analysis Methods used in Electrical Circuits. <p>(LAB):</p> <ol style="list-style-type: none"> 10. Dealing with laboratory equipment and electrical elements in a professional and scientific manner(i). 11. Ability to analyze electrical circuits and understand the nature of their work(ii). 12. Building a scientific mentality for the student through his ability to interpret the practical results according to theoretical concepts(iii). 13. Develop the student's ability to design simple electronic circuits in line with his scientific abilities(iv). 14. Analyze and simulate the process circuit using different software on the electronic calculator and match the results of the analysis with the practical results(v).
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Circuit Components and values</u></p> <p>DC circuits, Current and voltage definitions, Passive sign convention and circuit elements, Resistive networks, real and ideal elements, voltage and current sources. [9 hrs.]</p> <p>Lab. [6 hrs.]</p> <p>Revision problem and tutorial classes [6 hrs.]</p>

	<p>Quizzes [1 hr.]</p> <p>Part B- Circuit reduction</p> <p>combining sources, Combining resistive elements in series and parallel, delta and star transformation. [12 hrs.]</p> <p>Revision problem and tutorial classes [8 hrs.]</p> <p>Lab. [8 hrs.]</p> <p>Quizzes [1 hr.]</p> <p>Part C- Circuit Theory</p> <p>Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, Introduction to Thevenin and Norton theory, maximum power transfer, introduction to superposition theory. [24 hrs.]</p> <p>Revision problem and tutorial classes [16 hrs.]</p> <p>Lab. [16 hrs.]</p> <p>Quizzes [1 hr.]</p>
--	---

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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 type of simple experiments involving some sampling activities that are interesting to the students.</p>
-------------------	---

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	5% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	3	3% (9)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	1	25% (12)	Continuous	All
	Report	1	4% (4)	Continuous	All
	Classwork	1	5% (5)	12	All
Summative assessment	Midterm Exam	2 hr.	10% (10)	13	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Concept & Units: Electricity & atomic structure of substance, current and current density, current flow, electric circuit, E.M. F& potential difference
Week 2	international system of unit, abbreviation for multiples & sub-multiples, quantities derived from SI units, units of force-energy-torque and power, relation between energy and heat, electric units, efficiency & percentage efficiency, electromechanical equivalent of element
Week 3	Ohm's law, resistivity & conductivity
Week 4	temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	equivalent resistance: Series-parallel-circulating current method-floating source method & grouping of E.M.F. sources, double subscript
Week 6	power calculation in D.C circuit
Week 7	Kirchhoff's laws: KVL-KCL
Week 8	Mid-term Exam
Week 9	introduction to network theorems, types of sources: independent and dependent voltage and current sources and their transformation
Week 10	Maxwell's circulating currents (mesh analysis)
Week 11	nodal analysis
Week 12	superposition theorem
Week 13	Thevenin's theorem and Norton's theorem
Week 14	maximum power transfer theorem
Week 15	millman theorem, substitution theorem and reciprocity theorem
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law
Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

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.				