	Ministry of Higher Education and Scientific Research - Iraq University of Diyala College of Engineering Department of Engineering	

الملحق 4: وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Circuits**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**COE 203**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		1
Administering Department		BSc - COMM	**College**	College of Engineering	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		2024/9/1	**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

Module Objectives أهداف المادة الدراسية	1. This course deals with the basic information about the Transient Circuit: RC, RL, RLC circuit and parallel and their complete response in time and S- Domain. 2. Providing students with a way to understand Poly Phase Circuits: Single- phase three wire systems, circle diagram 3- phase balance an Unbalance system star and delta connections Power in 3- phase circuit. 3. Assisting the student to understand the basic of Coupling: Magnetic coupling coefficient of coupling, equivalent circuits, linear and ideal transformers. 4. Providing students with a way to understand information about the Two-Port Network: One- port network, Y-Z-G-H and parameters, image and iterative Operations, Attenuation and phase functions, and insertion loss of Networks. 5. Providing students with a way to understand Filters: Constant K– filers, low pass, high pass, and all pass filters, Active filters. 6. To develop problem solving skills and understanding of electrical circuit theory through the application of techniques modern. 7. Assisting the student in distinguishing and developing his scientific and artistic abilities. 8. Enriching the student's skills to be able to deal with electrical circuit with high efficiency. 9. Providing students with a way to use other modern technologies related to the educational process.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling the student to know the concepts of the Transient Circuit: RC, RL, RLC circuit series and parallel their complete response in time and S- Domain and Locus diagram. 2. Enabling the student to know about the use of Poly Phase Circuits: Single- phase three wire systems, Circle diagram of 3- phase balance an Unbalance system star and delta connections Power in 3- phase circuit 3. Enabling the student to deal with the skills of using the magnetic coupling coefficient of coupling, equivalent circuits, transformer: linear and ideal transformers. 4. Enabling the student to know the Two-Port Network: One- port network, Y-Z-G-H and parameters, image and iterative Operations, Attenuation and phase functions, and insertion loss of Networks. 5. Enabling the student to know the concepts of the Filters: Constant K– filers, low pass, high pass, and all pass filters, Network transformations, Active filters.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **<u>Part A - Methods of Analysis First order circuit and second order circuit</u>** • Introduction, Transient Circuit RC, RL, RLC circuit and parallel and series and their complete response in time and S- Domain and Locus diagram (24 hrs)

	Part B - Methods of Analysis and Applications • Poly Phase Circuits: Single- phase three wire systems, circle diagram 3- phase balance an Unbalance system star and delta connections Power in 3- phase circuit. (24 hrs) • Coupling: Magnetic coupling coefficient of coupling, equivalent circuits, linear and ideal transformers. (16 hrs) • Two-Port Network: One- port network, Y-Z-G-H and parameters, Attenuation and phase functions, and insertion loss of Networks. (16 hrs) • Filters: Constant K– filers, low pass, high pass, and all pass filters, Active filters. (16 hrs)
Description	Overview of electrical circuits: basic of Analysis First order circuit and second order circuit, Transient Circuit RC, RL, RLC circuit and parallel and series and their complete response in time and S- Domain. Enabling the student to know the methods of analysis and applications Poly Phase Circuits: Single- phase three wire systems, circle diagram 3- phase balance an Unbalance system star and delta connections Power in 3- phase circuit, Two-Port Network: One- port network, Y-Z-G-H and parameters, Attenuation and phase functions, and insertion loss of Networks and Filters: Constant K– filers, low pass, high pass, and all pass filters, Active filters.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**In this course, students are guided by:** • Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do the practical work. • Encourage students to work in groups.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**108**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**7**
Unstructured SWL (h/sem)	**42**	**Unstructured SWL (h/w)**	**2.8**

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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)	6 and 12	LO #1 to #3 and #4 to #6
	Assignments	2	5% (10)	2 and 13	LO #3 to #6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #6
Summative assessment	Midterm Exam	1hr	10% (10)	9	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	Overview of electrical circuits and their basic components and applications
Week 2,3,4,5	Analysis First & second order circuits Transient Circuit RC, RL, RLC circuit
	The source-free RC circuit and Singularity Functions.
	Step Response of an RC Circuit, Step Response of an RL Circuit
	RLC circuit, Tow mesh circuit and Tutorial
Week 6	S-Domain circuit, Locus Diagrams.
Week 7	**Poly phase Circuit:** 3- phase balance system star and delta connections Power in 3- phase circuit.
Week 8	**Poly phase Circuit:** 3- phase Unbalance system star and delta connections Power in 3- phase circuit.
Week 9	**Magnetically couple circuit:** Magnetic coupling coefficient of coupling.
Week 10	**Magnetically couple circuit:** Energy in a Coupled Circuit
Week 11	**Magnetically couple circuit:** Ideal Transformers and Linear Transformers.

Week 12	**Two-Port Network:** Introduction, one-Port Network
Week 13	**Two-Port Network:** Y-Z-G-H and parameters, Attenuation and phase functions, and insertion loss of Networks.
Week 14	**Filters:** Constant K– filters, passive filters (low pass, High pass, Band pass Band stop)
Week 15	**Filters:** Active filters (low pass, High pass, Band pass Band stop)
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to the lab and get started with use of components circuits
Week 2	Basic use of Electrical circuits
Week 3	**Transient Circuits: RC- Circuit series and parallel (source free, step response)**
Week 4	**Transient Circuits: RL- Circuit series and parallel (source free, step response)**
Week 5	**Transient Circuits: RLC- Circuit series (source free, step response)**
Week 6	**Transient Circuits: RLC- Circuit parallel (source free, step response)**
Week 7	**Poly phase Circuit:** 3- phase balance system star and delta connections
Week 8	**Poly phase Circuit:** 3- phase un balance system star and delta connections
Week 9	**Magnetically couple circuit:** Magnetic coupling coefficient of coupling, Energy in a Coupled Circuit
Week 10	**Magnetically couple circuit:** Ideal Transformers and Linear Transformers.
Week 11	**Two-Port Network: :** Y-Z parameters
Week 12	**Two-Port Network: :** G-H parameters
Week 13	**Filters:** passive filters (low pass, High pass, band pass, band stop)
Week 14	**Filters:** active filters (low pass, High pass)
Week 15	**Filters:** active filters (band pass, band stop)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Fundamentals Of Electric Circuits, 3rd edition, [Charles K.Alexander] [Matthew N. O. Sadiku], 2006.	Yes

	• SCHAUM'S OUTLINE of Electric Circuits, 5th edition.	
Recommended Texts	• Allan H. Robbins and Wilhelm C. Miller, **Circuit analysis: Theory and practice**, Cengage Learning, Fifth Edition, 2013. • Nilsson, James William, **Electric circuits**, Pearson Education India, 2008.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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.