وزارة التعليم العالي والبحث العلمي

جـــهاز الإشـــراف والتقـويم العلـمي

دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي ٢٠٢٣-٢٠٢٤

الجامعة : : تكريت

الكلية/ المعهد: كلية هندسة العمليات النفطية

القسم العلمي : هندسة سيطرة المنظومات النفطية

تاريخ ملء الملف : ٢٠٢٣/١١/٢٥

التوقيع :

اسم رئيس القسم : م. ياسين خضر ياسين

التاريخ : ٢٠٢٣/١١/٢٨

التوقيع :

اسم المعاون العلمي : ا.م.د.عمر ياسين ضايع

التاريخ : ٢٠٢٣/١٢/٣

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: م.م أيوب إبراهيم محمد

التاريخ : ٢٠٢٣/١١/٢٨

التوقيع

مصادقة السيد العميد

أ.م.د غسان حمد عبد الله

٢٠٢٣/١٢/٣

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Petroleum Process Engineering Department of Petroleum Systems Control Engineering	

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	ELECTRICAL			**Module Delivery**	
Module Type	SUPLEMENT			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	PCS111				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	1st	
Administering Department	PCS		**College**	PPE	
Module Leader	Amer B. Rakan		**e-mail**	amerbasheer@tu.edu.iq	
Module Leader's Acad. Title	Asst. Lect.		**Module Leader's Qualification**	MSc	
Module Tutor			**e-mail**		
Peer Reviewer Name	-		**e-mail**		
Review Committee Approval	-		**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 Aims أهداف المادة الدراسية	1. To study the systems of units and understand the fundamental concepts of current, voltage, and resistance. 2. To learn about resistors, including color coding, Ohm's Law, power, efficiency, and energy calculations. 3. To analyze DC circuits, including series circuits, Kirchhoff's Voltage Law, and the relationships within series circuits. 4. To understand voltage laws, including the voltage divider rule and the behavior of voltage sources in series. 5. To study the internal resistance of voltage sources and voltage regulation. 6. To analyze parallel circuits and their characteristics. 7. To apply current laws, including Kirchhoff's Current Law and the current divider rule, and analyze voltage sources in parallel circuits. 8. To analyze series-parallel circuits and their behavior. 9. To study source conversions, ladder networks, methods of analysis, and the behavior of current sources in parallel and series. 10. To analyze circuits using mesh analysis, including determinants, the branch current method, and the general approach to mesh analysis. 11. To apply mesh and nodal analysis methods, including the format and general approaches. 12. To understand bridge networks and the conversion between delta and star configurations. 13. To study network theorems, including superposition and its application. 14. To understand Thevenin's Theorem and Norton's Theorem, including their applications and the maximum power transfer theorem.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction: Systems of Units, Current, Voltage, Resistance Learn about the different systems of units used in electrical engineering. Understand the concepts of current, voltage, and resistance and their fundamental relationships. 2. Resistors: Color Coding, Ohm’s Law, Power, Efficiency, Energy Gain knowledge of resistor color coding and how to interpret resistor values. Understand Ohm's Law and its applications in electrical circuits. Learn about power calculations in resistive circuits and the concepts of efficiency and energy. 3. DC Circuits: D.C. Series Circuits, Kirchhoff’s Voltage Law, Series Circuits Relations. Study DC series circuits and analyze their behavior using Kirchhoff's Voltage Law. Understand the voltage and current relationships in series circuits. Learn how to calculate the

	total resistance, current, and voltage across each element in a series circuit. 4. Voltage Laws: Voltage Divider Rule, Voltage Sources in Series Learn the voltage divider rule and how to apply it in circuit analysis. Understand the behavior of voltage sources connected in series. Gain knowledge of the voltage distribution across a series circuit with multiple voltage sources. 5. Voltage Source: Internal Resistance of Voltage Sources, Voltage Regulation Understand the concept of internal resistance in voltage sources and its impact on circuit performance. Learn about voltage regulation and methods to maintain a stable output voltage. Gain knowledge of voltage regulators and their applications. 6. Parallel Circuits: Parallel Circuits Analysis Study parallel circuits and analyze their behavior using Kirchhoff's Current Law. Understand the current and voltage relationships in parallel circuits. Learn how to calculate the total resistance, current, and voltage across each element in a parallel circuit. 7. Current Laws: Kirchhoff's Current Law, Current Divider Rule, Voltage Sources in Parallel, Open and Short Circuits Understand Kirchhoff's Current Law and its application in circuit analysis. Learn the current divider rule and how to apply it in parallel circuits. Study the behavior of voltage sources connected in parallel. Gain knowledge of open and short circuits and their effects on circuit behavior. 8. Series-Parallel: Series-Parallel Circuits Understand the analysis and behavior of series-parallel circuits. Learn how to simplify complex series-parallel circuits into equivalent circuits. Analyze the voltage and current relationships in series-parallel configurations. 9. Source Conversions: Ladder Network, Methods of Analysis, Current Sources, Source Conversions, Current Sources in Parallel, Current Sources in Series Gain knowledge of ladder networks and their analysis methods. Learn about different methods of circuit analysis, such as nodal and mesh analysis. Understand current sources and their behavior in parallel and series configurations. Study source conversions between current sources and voltage sources. 10. Mesh Analysis: Determinants, Branch Current Method, Mesh Analysis (General Approach) Understand the concept of mesh analysis and its applications in circuit analysis. Learn the branch current method and how to solve circuits using determinants. Gain proficiency in applying mesh analysis to solve complex circuits.

	11. Mesh and Nodal Analysis: Mesh Analysis (Format Approach), Nodal Analysis (General Approach), Nodal Analysis (Format Approach) Further explore mesh analysis, focusing on different approaches and techniques. Learn about nodal analysis and its general and format approaches. Gain proficiency in applying nodal analysis to solve circuits. 12. Bridge Networks: Bridge Network, Delta to Star and Star to Delta Conversion 13. Understand the behavior and applications of bridge networks in circuit analysis. 14. Learn the concepts of delta-to-star
Indicative Contents المحتويات الإرشادية	1. Introduction: • Systems of Units: Introduction to different systems of units and their importance in electrical circuits. • Current, Voltage, Resistance: Understanding the fundamental concepts of current, voltage, and resistance and their relationship. 2. Resistors: • Color Coding: Learning how to interpret resistor color codes and determine their resistance values. • Ohm's Law: Understanding the relationship between current, voltage, and resistance. • Power, Efficiency, Energy: Exploring power calculations, efficiency, and energy consumption in resistor circuits. 3. DC Circuits: • D.C. Series Circuits: Analyzing series circuits and applying Kirchhoff's Voltage Law. • Series Circuits Relations: Understanding the relationships between voltage, current, and resistance in series circuits. 4. Voltage Laws: • Voltage Divider Rule: Learning how to calculate voltages in series circuits using the voltage divider rule. • Voltage Sources in Series: Analyzing circuits with multiple voltage sources connected in series. 5. Voltage Source: • Internal Resistance of Voltage Sources: Understanding the concept of internal resistance in voltage sources and its effect on circuit behavior. • Voltage Regulation: Exploring voltage regulation techniques and their importance in maintaining stable output voltages.

6. Parallel Circuits:
    - Parallel Circuits Analysis: Analyzing parallel circuits and calculating total resistance, current division, and voltage division.
7. Current Laws:
    - Kirchhoff's Current Law: Understanding Kirchhoff's Current Law and its application in circuit analysis.
    - Current Divider Rule: Learning how to calculate current division in parallel circuits.
    - Voltage Sources in Parallel: Analyzing circuits with multiple voltage sources connected in parallel.
    - Open and Short Circuits: Understanding the behavior of circuits in the presence of open and short circuit conditions.
8. Series-Parallel Circuits:
    - Series-Parallel Circuits: Analyzing circuits that contain both series and parallel components.
9. Source Conversions:
    - Ladder Network: Understanding ladder networks and their analysis using source conversions.
    - Methods of Analysis: Exploring different methods of circuit analysis, including source conversions.
    - Current Sources: Understanding the behavior and analysis of circuits with current sources.
    - Source Conversions: Converting voltage sources to current sources and vice versa.
    - Current Sources in Parallel: Analyzing circuits with multiple current sources connected in parallel.
    - Current Sources in Series: Analyzing circuits with multiple current sources connected in series.
10. Mesh Analysis:
    - Determinants: Introduction to determinants and their application in mesh analysis.
    - Branch Current Method: Using the branch current method to analyze circuits and calculate mesh currents.
    - Mesh Analysis (General Approach): Applying the general approach to mesh analysis in complex circuits.
11. Mesh and Nodal Analysis:
    - Mesh Analysis (Format Approach): Using the format approach for mesh analysis in circuits with specific configurations.
    - Nodal Analysis (General Approach): Understanding the general

	approach to nodal analysis and its application in circuit analysis. • Nodal Analysis (Format Approach): Applying the format approach to nodal analysis in circuits with specific configurations. 12. Bridge Networks: • Bridge Network: Understanding bridge networks and their applications in circuit analysis. • Delta to Star and Star to Delta Conversion: Learning how to convert circuits between delta and star configurations for analysis purposes. 13. Superposition: • Network Theorems: Introduction to network theorems and their applications in circuit analysis. • Superposition: Applying the superposition theorem to analyze circuits with multiple sources. 14. Thevenin's Theorem, Norton's Theorem: • Norton's Theorem: Understanding Norton's Theorem and its application in circuit analysis. • Maximum Power Transfer Theorem: Exploring the concept of maximum power transfer and its significance in circuit design and efficiency. • Thevenin's Theorem: Applying Thevenin's
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	he learning and teaching strategies for this course will focus on a combination of theoretical knowledge and practical application. The course will employ a variety of teaching methods such as lectures, demonstrations, and hands-on exercises to ensure a comprehensive understanding of the topics. Students will be encouraged to actively participate in discussions, ask questions, and engage in problem-solving activities. The use of visual aids, simulations, and real-world examples will help illustrate the concepts and make them more relatable. Additionally, collaborative learning and group projects will be incorporated to promote teamwork and critical thinking skills. Regular assessments and feedback will be provided to monitor the progress of students and address any challenges they may encounter. The course will aim to create a supportive and interactive learning environment that fosters curiosity, encourages exploration, and equips students with the necessary knowledge and skills in electrical circuit analysis.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
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)	4,11	LO#1-4 and #8-12
	Assignments	5	10%(10)	Continuous	
	Case study	2	5%(5)	6,13	LO#1-5 and #8-12
	Report	5	15%(15)	3,5,7,9,13	LO#3,5,7,9,13
Summative assessment	**Midterm Exam**	3 hr	10%(10)	7	LO#1-7
	Final Exam	3 hr	50%(50)	16	All
Total assessment			100%(100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction:** Systems of Units, Current, Voltage, Resistance
Week 2	**Resistors:** Color Coding, Ohm's Law, Power, Efficiency, Energy
Week 3	**DC Circuits:** D.C. Series Circuits, Kirchhoff's Voltage Law, Series Circuits Relations
Week 4	**Voltages laws:** Voltage Divider Rule, Voltage Sources in Series
Week 5	**Voltage source:** Internal Resistance of Voltage Sources, Voltage Regulation
Week 6	**Parallel circuits:** Parallel Circuits analysis
Week 7	**Current laws:** Kirchhoff's Current Law, Current Divider Rule, Voltage Sources in Parallel, Open and Short Circuits
Week 8	**Series-Parallel:** Series-Parallel Circuits
Week 9	**Source Conversions:** Ladder Network, Methods of Analysis, Current Sources, Source Conversions, Current Sources in Parallel, Current Sources in Series

Week 10	**Mesh Analysis:** Determinants, Branch Current Method, Mesh Analysis (General Approach)
Week 11	**Mesh and Nodal Analysis:** Mesh Analysis (Format Approach), Nodal Analysis (General Approach), Nodal Analysis (Format Approach)
Week 12	**Bridge Networks:** Bridge Network, Delta to Star and Star to Delta Conversion
Week 13	**Superposition:** Network Theorems, Superposition
Week 14	**Thevenin's Theorem, Norton's Theorem:** Norton's Theorem, Maximum Power Transfer Theorem
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Robert L. Boylested, **Introduction circuit analysis 5th Ed.**, Columbus Merrill Pub. Co., 1982	
Recommended Texts		
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.