Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Cybersecurity and Cloud Computing Techniques Engineering

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Electrical Engineering**			**Module Delivery**	
Module Type	**Core**			✓ **Theory** ✓ **Lecture** ✓ **Lab** ✓ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	**BCYSCE104-S1**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Cyber Security and Cloud Computing Techniques Engineering		**College**	**Northern Technical University** **Engineering Technical College/Mosul**	
Module Leader	Dr. Thabat F. Thabet		**e-mail**	thabat.tfy@ntu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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. To learn the basics of electrical elements (Symbols and Abbreviations, Units, Electric Circuit and Direct Current). 2. Study Ohm's law 3. To learn Kirchhoff's Laws 4. Network Analysis Methods 5. Study The Alternating Current Network 6. Phase Diagram
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 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. Define Ohm's law. 5. Explain the two Kirchoff's laws used in circuit analysis. 6. Use different Network Analysis Methods to analyze and solve the electrical circuits 7. Discuss the various properties of resistors, capacitors, and inductors. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Introduction to electrical circuits</u> Symbols And Abbreviations, Units, Electric Circuit & It's Element. The Direct Current Network. Ohm's law, Series Circuits, Parallel Circuits, Series-Parallel Circuits, Open and Short Circuits, Source Transformation Conversion Of Delta to Star Connection And Vice Versa [15 hrs] <u>Part B - Kirchhoff's Laws</u> How to use in Network Analysis. [5 hrs] <u>Part C - Network Analysis Methods</u> Loop (mesh) Current Method. Superposition Method. Thevenin's Theorem Norton's Theorem

	Maximum Power Transfer Theorem Nodal Voltage Method. [30 hrs] Part D - The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms. The Mean Values of Current and Voltage the Effective Vales of Current and Voltage Circuit Elements in the Phase Domain The Vector Diagram Series Ac Circuits and Parallel Ac Circuits Using Kirchhoff's laws to solve AC circuits [20 hrs] Revision problem classes [5 hrs]

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 للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	6	10% (10)	4, 5, 6, 8, 11 and 12	LO #4, #5, #6, #7, #8 and #9

	Assignments	7	10% (10)	3, 4, 5, 6, 8, 11 and 12	LO #4, #5, #6, #7, #8 and #9
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	6	10% (10)	13	LO #4, #5, #6, #7, #8 and #9
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	**Symbols And Abbreviations, Units, Electric Circuit & It's Element. The Direct Current Network.**
Week 2	**Ohm's law, Series Circuits, Parallel Circuits, Series-Parallel Circuits, Open and Short Circuits, Source Transformation**
Week 3	**Conversion Of Delta to Star Connection And Vice Versa**
Week 4	**Kirchhoff's Laws How to use in Network Analysis..**
Week 5	**Loop (mesh) Current Method.**
Week 6	**Superposition Method.**
Week 7	**Thevenin's Theorem**
Week 8	**Norton's Theorem**
Week 9	**Maximum Power Transfer Theorem**
Week 10	**Nodal Voltage Method**
Week 11	**Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms.** **The Mean Values of Current and Voltage the Effective Vales of Current and Voltage**
Week 12	**Circuit Elements in the Phase Domain** **The Vector Diagram**
Week 13	**Series Ac Circuits and Parallel Ac Circuits**
Week 14	**Using Kirchhoff's laws to solve AC circuits**
Week 15	**Preparatory week before the final Exam**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	**Basic information**
Week 2	**Color of resistance**
Week 3	**Ohm's law and resister in series and parallel**
Week 4	**Star and delta connection**
Week 5	**Kirchhoff's law**
Week 6	**Superposition theorem**
Week 7	**Thevenin's Theorem**
Week 8	**Maximum Power Transfer**
Week 9	**Norton's Theorem**
Week 10	**Operating of Oscilloscope (CRO)**
Week 11	**Utilization of Oscilloscope**
Week 12	**The Sine wave**
Week 13	**Application of AC signal**
Week 14	**Time constant**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electric Circuits, by: James W. Nilsson and Susan A. Riedel Pearson Education Limited 10th edition 2015	Yes
Recommended Texts	FUNDAMENTALS OF ELECTRICAL ENGINEERING, by: Giorgio Rizzoni, McGraw-Hill, 1st edition, 2009.	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.