

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronic I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	MECT 108		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UG1 1	Semester of Delivery	1
Administering Department	Mechatronics	College	Technical Engineering college
Module Leader	Hussein Ali Hussein	e-mail	husseeinelec1982@gmail.com
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	MSc
Module Tutor	None	e-mail	
Peer Reviewer Name	Hussein Ali Hussein	e-mail	husseeinelec1982@gmail.com
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 Aims أهداف المادة الدراسية	Course Objectives: 1. This course aims to provide a good platform to Mechatronics students to understand, model and appreciate concept of electronic circuit. 2. To prepare them to carry out experimental investigation and analysis at later Stages of graduation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Outcomes: 1. To apply the knowledge of mathematics, science and engineering fundamentals to model the electronic circuits 2. To identify and formulate electronic circuits on the fundamental's laws of electric engineering. 3. To instill envisage appropriate experiments related to electronic circuits 4. To investigate the effectiveness of electronic circuits for the benefit of mankind.
Indicative Contents المحتويات الإرشادية	1. Semiconductor Fundamentals & Diode Physics (Weeks 1-4) This module builds the foundational knowledge required to understand modern electronics: Semiconductor Physics: Atomic structure, energy bands, and the behavior of P-type and N-type materials. The PN-Junction: The formation of the depletion region, forward and reverse bias mechanisms. Diode Characteristics: Analysis of V-I curves for standard silicon diodes and specialized components. 2. Diode Circuit Applications (Weeks 5-8) Focuses on how diodes are used to manipulate electrical signals: Power Conversion: Rectification processes (Half-wave and Full-wave/Bridge rectifiers). Signal Shaping: Detailed study of Clipping (limiting voltage levels) and Clamping (shifting DC levels) circuits. Optoelectronics: Operational principles of Photo cells, Photo diodes, and Light Emitting Diodes (LEDs). 3. Bipolar Junction Transistors - BJT (Weeks 9-11) Introduction to active three-terminal devices: BJT Operation: Understanding NPN and PNP structures and their roles as switches or amplifiers. DC Biasing: Methods to establish a stable Q-point (Operating Point) using Fixed-bias, Self-bias, and Voltage Divider configurations. 4. Advanced Transistors & Small Signal Analysis (Weeks 12-15) Advanced modeling for Mechatronics applications: Field Effect Transistors (FET): Modeling and analysis of JFETs and

	MOSFETs, emphasizing their high input impedance. • Small Signal Amplifiers: AC analysis of transistor circuits to calculate voltage and current gain. • Impedance Parameters: Calculating Input and Output Impedance to ensure proper circuit matching and signal integrity.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assessment is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.

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 أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Semiconductor physics
Week 2	PN-junction
Week 3	diodes
Week 4	Characteristics of different diodes
Week 5	Diodes applications
Week 6	Diodes applications
Week 7	Photo cell, Photo diode
Week 8	Light emitting diode
Week 9	Bipolar transistor
Week 10	Biasing of bipolar transistor
Week 11	Biasing of bipolar transistor
Week 12	Modeling and analysis of FET transistor
Week 13	Small signal model of transistor
Week 14	Small signal amplifier
Week 15	Input and output impedance
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	To obtain V-I characteristics of PN junction diode
Week 2	Half wave rectifier
Week 3	Half wave rectifier with filter
Week 4	Bridge rectifier with filter
Week 5	Clipping circuits
Week 6	Clamping circuits
Week 7	Zener diode characteristic
Week 8	Photo diode
Week 9	Common base Transistor
Week 10	Self-biasing
Week 11	Voltage divider biasing
Week 12	Finding H-parameter
Week 13	Finding input / output impedance
Week 14	Small signal amplifier
Week 15	FET characteristic

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mechatronics – circuits analysis and design / by Donald A. Neamen	yes
Recommended Texts	-R. L. Boylestad and L. Nashelsky, <i>Electronic Devices and Circuit Theory</i> , 11th ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2013.	-
Websites	-	

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.

د. هارون عبد الكاظم محمد
العميد

عميد الكلية : أ.د. هارون عبد الكاظم شهد

التاريخ : 2026 / 3 / 25

AF Hamdan

رئيس القسم : أ.د. حسين فاضل حمدان

التاريخ : 2026 / 3 / 25

اسم التدريسي: م.م. حسين علي حسين

اسم التدريسي: م.م. حسين علي حسين

التاريخ : 2026 / 3 / 25