	Ministry of Higher Education and Scientific Research - Iraq **Al-Naji University** **College of Engineering** **AI Engineering Department**	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Electronic**			**Module Delivery**	
Module Type	C			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	AIA2307				
ECTS Credits	**6**				
SWL (hr/sem)	150				
Module Level	2		**Semester of Delivery**	3	
Administering Department	AI Engineering		**College**	ENGINEERING	
Module Leader	Dr. Maher Faik Ismail		**e-mail**	maherfaik3@alnaji-uni.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Circuit	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• To introduce the concept of semiconductors and devices along with applications, power supply components, diodes, and amplifiers. • To present a problem oriented introductory knowledge of Analog circuits and its applications. • To impart an in-depth knowledge in electronic semiconductor devices & circuits giving importance to the various aspects of design & analysis. • To provide a thorough understanding of the operational BJT circuits and their functions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Employ simple lumped circuit models for resistors, sources, inductors, capacitors, and transistors in circuits. • Analyze circuits made up of linear lumped elements. Specifically, analyze circuits containing resistors and independent sources using techniques such as the node method, superposition and the Thevenin method. • Employ Boolean algebra to describe the function of logic circuits. • Design circuits which represent digital logic expressions. Specifically, design a gate-level digital circuit to implement a given Boolean function. • Check static discipline constraints in circuits. For example, determine if the circuit representing a gate provides adequate noise margins. • Understand the basics of semiconductors and Diodes Analyze working of Rectifiers, filters, and regulators circuits. • Design biasing scheme for transistor circuits. • Model BJT and FET amplifier circuits
Indicative Contents المحتويات الإرشادية	• Diode Circuits: Diode clipping circuits - Single level and two level clippers - Clamping circuits – Design of Zener Voltage Regulators. • Junction Transistor and Transistor Biasing: CB, CE, CC (Relationship between α, β, γ) circuit configuration Input-output characteristics, Equivalent circuit of ideal and real amplifiers, L. • Bipolar Junction Transistors : Review of BJT characteristics- Operating point of a BJT – Factors affecting stability of Q point and DC Biasing – Biasing circuits: fixed bias, collector to base bias, voltage division bias and self bias. (Derivation of stability factors for Voltage Divider Biasing only) –Bias compensation using diode and thermistor. • FET and JFET Transistors: Introduction, device structures and physical operations, i-v characteristics, DC and AC load line, brief analysis as an amplifier. • MOS Field Effect Transistors: Introduction, device structures and physical operations, i-v characteristics, brief analysis as an amplifier, and as a switch, Biasing, FET and MOSFET circuits: DC biasing; self-bias; feedback bias; voltage divider bias, fixed bias.

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 محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** 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**	3	10% (10)	3 , 6 and 10	**Example** LO #3, #6 and #10
	Lab	1	10% (10)	2 and 12	All
	Projects	15	10% (10)	Continuous	All
	HomeWork	3	10% (10)	Continuous	
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Foundations of Electronics & Semiconductors
Week 2	Diode Characteristics & Models
Week 3	Diode Applications I

Week 4	Diode Applications II & Special Diodes
Week 5	BJT Fundamentals
Week 6	BJT DC Biasing
Week 7	BJT Modeling
Week 8	BJT Applications
Week 9	FET Fundamentals (JFET)
Week 10	FET Biasing (JFET)
Week 11	MOSFET Fundamentals
Week 12	FET Applications (MOSFET)
Week 13	FET Applications I
Week 14	MOSFET Applications II
Week 15	Advanced FET/MOSFET Circuits
Week 16	Final Review & Exam Preparation

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	V-I Characteristics of Silicon PN Junction diode
Week 2	V-I Characteristics of zener diode
Week 3	Diode application; clipping; clamping; voltage doubler.
Week 4	Characteristics of BJT and DC load line
Week 5	JFET I-V characteristics and DC load line
Week 6	MOSFET characteristics

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Electronic Devices and Circuit Theory Robert L Boylestad Louis Nashelsky Pearson 11th Edition, 2015	
Recommended Texts	Electronic Devices and Circuits Millman and Halkias Mc Graw Hill 4th Edition, 2015.	
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.