MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of Electronic Devices**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**LAER210**				
ECTS Credits	**7**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Abdulghafar sowaylim mahousd		**e-mail**		
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Abdulghafar sowaylim mahousd		**e-mail**		
Peer Reviewer Name	~~Name~~		**e-mail**	Email	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	LAER120 - AC Electrical Circuits	**Semester**	2
Co-requisites module	LAER412 - Control Theory	**Semester**	7

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims 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	Knowledge	A2	A2-1: Recognize the basic principles, components, and behavior of electronic circuits. A2-2: Classify different electronic devices such as resistors, capacitors, diodes, and transistors according to their functions and characteristics. A2-3: Apply modern tools and measurement techniques to analyze, design, and troubleshoot electronic systems.
		A3	A3-1: Measure electrical quantities and circuit parameters accurately using standard instruments and testing procedures. A3-2: Analyze experimental data, circuit behavior, and electronic component performance to draw conclusions and troubleshoot practical problems.
	Skills	B1	B1.1 Function efficiently as an individual B1.2 Function as a member of multidisciplinary and multicultural teams
		B2	B2.1 Communicate effectively – graphically with a range of audiences using contemporary tools. B2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.
	Ethics	C2	C1-1: Commit to quality standards. C1-2: Adhere to deadlines. C1-3: Strive for continuous improvement.
	1.		
	Unit -I [22 hrs] **Diode Circuits:** Diode clipping circuits - Single level and two level clippers - Clamping circuits – Design of Zener Voltage Regulators.		

Indicative Contents المحتويات الإرشادية	Unit -II [25 hrs] **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. Unit-III [28 hrs] **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.
	Low frequency equivalent circuit of BJT Common: Emitter amplifier - AC Equivalent Circuit – Role of coupling and emitter bypass capacitors – h parameter model of BJT - Amplifier gains and impedances calculations using h equivalent circuit.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Presentation • Interactive learning • Discussions • Brainstorming • Group Solving Problems • Problem-Based Learning • Self-learning.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدرا يس المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدرا يس المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدرا يس غ ري المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدرا يس غ ري المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدرا يس الك يل للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	
	Assignments	3	10% (10)	4, 8,13	
	Projects / Lab.	1	15% (15)		
	Report	1	5% (5)		
Summative assessment	Midterm Exam	3 hr	10% (10)		
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري 15 أسبوعا

	Material Covered	
Week 1	Diodes, diode equation	A2-1, A2-2, A3-1, A3-2
Week 2	Graphical/Load line analysis	A2-3, A3-2, B2.1
Week 3	Diode models	A2-2, A2-3, A3-2
Week 4	Zener diodes	A2-1, A2-2, A3-1, A3-2
Week 5	Diode applications; peak sample, power rectifier, clipping, clamping, regulator	A2-3, A3-2, B1.1, C1-1
Week 6	Bipolar transistors (BJT); Definitions	A2-1, A2-2, A3-1
Week 7	Mid-term Exam	A1
Week 8	BJT V-I characteristics, breakdown	A3-1, A3-2, A2-3
Week 9	AC load line	A2-3, A3-2
Week 10	Transistor biasing	A2-3, A3-2, B2.2
Week 11	Hybrid-pi equivalent circuit	A2-2, A2-3, A3-2
Week 12	H-parameters	A2-3, A3-2
Week 13	Common-emitter large signal model, graphical analysis	A2-3, A3-2, B2.1

Week 14	Common-collector, common base amplifiers	A2-3, A3-2, B1.2
Week 15	Applications: current source, DC power supply regulator	A2-3, A3-2, C1-1, C1-3
Week 16	**Preparatory week before the final Exam**	**A2,A3**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered	
Week 1	V-I Characteristics of Silicon & Germanium PN Junction diodes 13	A3
Week 2	V-I Characteristics of Zener Diode	A3
Week 3	Diode application; clipping; clamping; voltage doubler	A3
Week 4	Half Wave and Full Wave Rectifier	A3
Week 5	Characteristics of BJT and DC load line	A3
Week 6	Common Emitter BJT Amplifier	A3
Week 7	BJT amplifier frequency response	A3

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	YES
Recommended Texts	Electronic Devices and Circuits Millman and Halkias Mc Graw Hill 4th Edition, 2015.	NO
Websites	https://eng.alayen.edu.iq//colleges/e/42	

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.