

MODULE DESCRIPTION FORM

Module Information			
Module Title	Electronic Circuits		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code	LAER220		
ECTS Credits	6.00		
SWL (hr/sem)	150 H/Sem.		
Module Level	2	Semester of Delivery	4
Administering Department	Laser & optoelectronics Engineering	College	College of Engineering
Module Leader	Abdulghaffar S M.	e-mail	
Module Leader's Acad. Title	Assistant Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Zahraa Hussien	e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
Prerequisite module	LAER120, LAER210	Semester	2,3
Co-requisites module	LAER410	Semester	7

Module Aims, Learning Outcomes and Indicative Contents		
Module Objectives	This course aims to: - Understand transistor operation. - Analyze and design amplifier circuits. - Study operational amplifiers and their applications. - Apply electronic circuits in laser devices.	
Module Learning Outcomes	Knowl edge A2	A2.1 recognize the biasing circuits for FET transistor amplifiers and MOSFET amplifiers.



			A2.2 understand the transistor switching and the concept of feedback, its types and design of feedback circuits A2.3 analyze FET and MOSFET A2.4 Determine the output produced by a circuit for a given set of inputs using the switch resistor model of a MOSFET. A2.5 classify the operational amplifiers, Active filters . A2.6 Perform a small-signal analysis of op- amplifier using small signal models for the circuit elements.
		A3	A3.1 Design and analysis of FET and MOSFET amplifiers. A3.2 Determine the output produced by a circuit for a given set of inputs using the switch resistor model of a MOSFET. A3.3 Perform a small-signal analysis of an amplifier using small signal models for the circuit elements
	skills	B2	B.2.1 Communicate effectively – graphically with a range of audiences using contemporary tools.
			B.2.2 Communicate verbally and in writing with a range of audiences using contemporary tools.
		B3	B.3.1 Acquire and apply new knowledge.
			B.3.2 Practice the strategies of searching for information in life – long self-learning
	Ethics	C3	C.3.1 Utilize contemporary technologies
			C.3.2 Make use of codes of practice and standards, quality guidelines,
			C.3.3 Utilize health and safety requirements
			C.3.4 Show environmental issues and risk management principles.
Indicative Contents			Ac Analysis, Amplification In Ac Domain, The re Transistor Model, Common Emitter Configuration , Common- Base Configuration (8hrs)



	Collector Feedback Configuration, Emitter – Follower Configuration, Common- Base Configuration, Miscellaneous Bias Configuration (4hrs) Effect Of RL And Rs, Determine The Current Gain (4hrs) Field – Effect Transistors, Construction And Characteristics of JFETs, Transfer Characteristics, (4hrs) Depletion-Type MOSFET , Basic Construction, Basic Operation and Characteristics, P -Channel Depletion-Type MOSFET(4hrs) Fet Biasing, Fixed-Bias Configuration, Self-Bias Configuration (4hrs) Voltage-Divider Biasing, Common-Gate Configuration , Depletion-Type MOSFETs (4hrs) FET Amplifier, JFET Small-Signal Model , JFET Ac Equivalent Circuit, Fixed-Bias Configuration(4hrs) Self-Bias Configuration, Voltage-Divider Configuration, Common-Gate Configuration (4hrs) Depletion-Type MOSFETs (4hrs) Operational Amplifier, Op-Amp Basics, Inverting Amplifier, Noninverting Amplifier, Unity Follower, Summing Amplifier, Integrator, Differentiator(8hrs) Op-Amp Applications, Multiple-Stage Gains, Voltage Summing , Voltage Subtraction (8hrs)
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Learning and Teaching Strategies

Strategies	• Presentations • Discussions • Tutorial and graphics • Problem solving • Brain storming • Research and reporting • Report & discussion assessment
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Student Workload (SWL) for 15 weeks

Structured SWL (h/sem)	93	Structured SWL (h/w)	6
Unstructured SWL (h/sem)	57	Unstructured SWL (h/w)	3.5
Total SWL (h/sem)	150		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered	LOs
Week 1	Review of Electronics (1) and semiconductor basics.	
Week 2	BJT and FET and operating regions	A2.1, B2.1
Week 3	JFET, BJT biasing techniques	A2.1,A2.2 B2.1,C3.1



Week 4	Small signal analysis	A2.3,A2.4, B2.1,C3.2, B3.1
Week 5	Common source amplifier	A2.2, A2.4, B2.2
Week 6	Common drain and common gate amplifiers	A2.2, A2.4, B2.2
Week 7	MOSFET fundamentals	A2.1,A2.2 B2.1,C3.1
Week 8	MOSFET amplifier analysis	A2.3,A2.4, B2.1,C3.2, B3.1
Week 9	Multistage amplifiers	A2.5, B2.1
Week 10	Differential amplifier	A2.4, B2.1
Week 11	Operational amplifier fundamentals	A2.5, B2.1
Week 12	Op-Amp applications	A2.6, B2.1
Week 13	Active filters	A2.5, A2.6 B2.1,B3.1 , C3.1
Week 14	Applications OF Active filters	A2.5, B2.6
Week 15	Frequency response of amplifier	A2.4, B3.1
Week 16	Preparatory week before the final Exam	A2

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	A2
	Interaction within the class	All	10% (10)	All	A2, B2, C3
	Assignments	2	10% (10)	4 and 10	A2,B1,B2
	Projects / Lab.	3	10%(10)	3,9 and 12	B2, B3, C3
	Report	1	10% (10)	13	A2
Summative assessment	Midterm Exam	1hr	10% (10)	14	A2
	Final Exam	3hr	50% (50)	15	A2



Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	JFET I-V characteristics
Week 2	JFET small signal amplifier
Week 3	JFET frequency response
Week 4	MOSFET characteristics
Week 5	MOSFET Negative Feedback
Week 6	Op-Amp Circuits; inverting, non-inverting
Week 7	Op-Amp Circuits; summing differentiating

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Devices and Circuit Theory – Boylestad	Yes
Recommended Texts		
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.

