

MODULE DESCRIPTION FORM

Module Information			
Module Title	Electronic Circuits		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code	MDER 120		
ECTS Credits	5		
SWL (hr/sem)	95 H/Sem.		
Module Level	1	Semester of Delivery	2
Administering Department	Artificial Intelligence		College
College of Engineering		e-mail	alwanmoamel@gmail.com
Module Leader	MOAMEL ALWAN		
Module Leader's Acad. Title	Master.		Module Leader's Qualification
Master.			
Module Tutor	Zahraa Hussein Najm		e-mail
zahraa2003hhho00@gmail.com			
Peer Reviewer Name	Hasnaa Mohamed		e-mail
Hasnaa.mohammad@alayen.edu.iq			
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
Prerequisite module	MDER 110	Semester	1
Co-requisites module	MDER 120	Semester	2

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To define and explain the fundamental concepts of sinusoidal AC waveforms, impedance, phasors, and the behavior of R, L, and C elements in AC circuits. 2. • analyze AC circuit techniques, including complex numbers, mesh and nodal analysis, source conversion, and delta–star transformations in solving circuit problems. 3. • To design and evaluate AC circuits by assessing power components (P, Q, S), power factor, and overall circuit performance using appropriate analytical methods.

1
أ.م.د. سرمد محمد ذياب



Module Learning	A	A2	A 2.1: Define PN Junction, Diode, Rectifiers, PIV, Clipper & Clamper circuits, BJT, JFET/MOSFET, Biasing, Logic Gates, Feedback, Oscillator, and Operational Amplifier A 2.2 Memorize diode and rectifier formulas, PIV and power equations, BJT current relations (α, β), FET characteristic equations, small-signal parameters, and gain formulas. A2.3 Understand forward/ reverse bias operation, rectifier and clipping principles, transistor operating regions and characteristics, feedback effects, oscillator operation, and op- amp configurations. A 2.4 Apply circuit laws and device equations to analyze and design diode, BJT, FET, feedback, oscillator, and op-amp circuits. A2.5 Classify semiconductor devices such as diodes and MOSFETs in electronic circuits A2.6 Evaluate the performance of circuits using devices like diodes or MOSFETs by applying circuit laws
		A 3	A 3.1 Name of the basic device A 3.2 Explain the device and circuit A 3.3 Apply circuit analysis methods, rules, and theorems A3.4 Calculate the experimental result
	B	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 lifelong self-learning.
	C	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	A. Semiconductor Devices and Diode Circuits
		20 Hours • PN Junction and Diode Operation • Diode Circuit Analysis • Rectifier Circuits • Peak Inverse Voltage (PIV) • Diode Power Dissipation • Clipper and Clamper Circuits • Energy Harvesting from Solar Cells
		• B. Transistor Circuits (BJT & FET) 20 Hours • BJT Structure and Characteristics • DC Biasing • BJT Applications • JFET / MOSFET Structure and Characteristics • FET Applications in DC • Small-Signal AC Analysis
		20 Hours • Logic Gates • Basic Digital Circuits • Feedback Circuits • Oscillator Circuits • Operational Amplifiers • • Review & Midterm within schedule

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
	Material Covered	Los
Week 1	PN Junction and Diode Operation	A 2.1
Week 2	Diode Circuit Analysis	A2.1,A2.2,A2.3,
Week 3	Rectifier Circuits (Half & Full Wave)	A2.1,A2.2,A2.3,A2.4
Week 4	Peak Inverse Voltage (PIV) & Power Dissipation	A 2.1,A2.2,A2.3,A2.4
Week 5	Clipper and Clamper Circuits	A 2.1,A2.2,A2.3,A2.4,C
Week 6	Energy Harvesting from Solar Cells	A 2.3,A2.4,A2.5,A2.6,B,C
Week 7	BJT Structure and Characteristics	A2.2,A2.3,A2.4,B,C

Week 8	BJT DC Biasing and Applications	A2.2,A2.3,A2.4,B,C
Week 9	Midterm Examination	A2
Week 10	JFET / MOSFET Structure and Characteristics	A2.1,A2.3,A2.4,A2.5,B,C
Week 11	FET Applications in DC Circuits	A2.1,A2.3,A2.4,A2.5,B,C
Week 12	FET Small-Signal AC Analysis	A2.1A2.3,A2.4,A2.5,B,C
Week 13	Logic Gates and Basic Digital Circuits	A2.1,A2.3,A2.4,A2.5,B,C
Week 14	Feedback Circuits	A2.1,A2.3,A2.4,A2.5,B,C
Week 15	Oscillator Circuits	A 2.1,A2.3,A2.4,A2.5,B,C
Week 16	Final	A2

Learning and Teaching Strategies

Strategies	• Presentations • Brainstorm • Tutorial and graphics • Problem solving • Research and reporting • Problem Solving • Report & discussion assessment
-------------------	--

Student Workload (SWL)

Structured SWL (h/sem)	62	Structured SWL (h/w)	4.13
Unstructured SWL (h/sem)	33	Unstructured SWL (h/w)	2.2
Total SWL (h/sem)	95		

Module Evaluation

تقييم المادة الدراسية

		Time/ Numb er	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessme nt	Quizzes	2	10% (10)	5, 10	A2
	Assignments	2	10% (10)	2, 12	A2
	Projects / Lab.	10	10%	All	A3
	Report	1	10% (10)	13	A2,B1,B2
Summative	Midterm	2 hr	10% (10)	5	A2

e assessment	Exam				
	Final Exam	4hr	50% (50)	16	A2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الأسبوعي للمختبر		
	Material Covered	LOs
Week 1	Diode Characteristics	A 3.1
Week 2	Rectifier Circuits	A 3.2,A3.3,A 3.4
Week3	Clipper and Clamper Circuits	A 3.2,A3.3,A 3.4
Week 4	Solar Cell Power Measurement	A 3.2,A3.3,A3.4
Week 5	BJT Biasing and Amplification	A 3.2,A3.3,A3.4
Week6	FET Characteristics (JFET / MOSFET)	A 3.2,A3.3,A3.4
Week7	Logic Gates Implementation	A 3.2,A3.3,A3.4
Week 8	Feedback and Oscillator Circuits	A3.2,A3.3,A3.4
Week 10	Operational Amplifier Applications	A 3.2,A3.3,A3.4

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Power Electronics - circuits, devices and applications", 3rd ed., 2003- Muhammad H. Rashid.	Yes
Recommended Texts	Power Electronics, Author: Daniel W. Hart, Edition: 1st, 2010.	NO
Websites	https://eng.alayen.edu.iq//colleges/e/42	

Grading Scheme مخطط الدرجات				
Group	Grade	التعليق	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.				