

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Analog electronics		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code			
ECTS Credits			
SWL (hr/sem)			
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Asaad Mjbel Abbas Dr. jasim shamki alikhan		e-mail Asaadmjbel@uomustansiriyah.edu.iq jshamki@uomustansiriyah.edu.iq
Module Leader's Acad. Title	Assist Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
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 Objectives أهداف المادة الدراسية	The educational objectives of this course are: 1. Understand the meaning and basic components of analog electronics. 2. Learn the basics of analogue electronic signals and their characteristics. 3. Knowledge of electrical semiconductor materials, the energy bands in which they are found, how electrons are distributed in them, and how the majority of charge carriers are in these materials. 4. Knowledge of diode, how to bias a diode, circuit analysis of forward and reverse bias, band gap alignment and Shockley equation 5. To learn voltage correction: half-wave rectifier, full-wave rectifier, and bridge rectifier 6. Knowledge of voltage filtering: RC filter and LC filter 7. Knowledge of Zener diode and transistor
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1 Apply circuit laws, theorems and methods of systematic analysis to predict the steady state behaviour of circuits. 2 Explain the operation of analog circuits 3 Use piecewise linear models to predict the steady state behaviour of simple diode and transistor circuits,. 4 Simulate simple analog circuits to verify their behaviour. 5 Explain the transient behaviour of diode, rectifier, and transistor 6 Students will have practical knowledge of the use of electronic circuits
Indicative Contents المحتويات الإرشادية	This course will enable the students to understand the basics of construction, working, and applications of various types of electronic components and understand clearly the principles and functioning of the basic analogue components and circuits , which includes the understanding of analogue signal model and Identify the concept of majority and minority charge carriers and their distribution within energy band and Understand the concepts, structure and types of analogue electronic circuits also, Students will have practical knowledge of the use of electronic circuits and Identify the diode, rectifier, and transistor therefore one of the basic core courses which is must for every electronic engineer and hence should be taken very sincerely by students.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This course uses content in-person lectures, workshops, and practicals to achieve its learning objectives. Lectures set the scene and cover important foundations at the start of the course and for each new topic. The online pre-recorded presentations focus on key concepts and are supported by practice exercises to test and develop
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	understanding. Workshops involve working in small groups on a variety of problems including theory problems, benchtop experiments and simulations. There is a small assessment component for active participation in workshops. Practicals provide an opportunity to consolidate understanding and to develop hands-on skills with prototyping, testing and measurement.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7,
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5 #8 #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction Analog and Digital Signals: Sinusoidal Signal Rectangular Signal. Amplitude, Frequency, Duration Repetition Duty Cycle
Week 2	Exercises and Discussion
Week 3	Energy Bandgap Theory Insulators, Conductors & Semiconductors
Week 4	Intrinsic and Extrinsic Semiconductors
Week 5	Exercises and Discussion
Week 6	P-N Junction Diode Diode Biasing & Circuit Analysis: Forward & Reverse Bias Energy Band Alignment
Week 7	Shockley Equation I-V Characteristics Quality Factor Series and Dynamic Resistances
Week 8	Dc Power Supply: Voltage Rectification: Half-Wave Rectifier Full-Wave Rectifier & Bridge Rectifier
Week 9	Voltage Filtration: RC-Filter LC-Filter Zener Diode: I-V Characteristics
Week 10	Voltage Regulation: Zener Diode as Regulator Regulators IC 7805 IC 7812 IC 7905
Week 11	Exercises and Discussion
Week 12	Optoelectronic Devices Photo-diode Photo-resistor Light Emitting Diode (LED)
Week 13	Laser Diode LCD Display

Week 14	Solar Cell: Overview and Fabrication I-V Characteristics Efficiency Tandem Solar Cell Structure
Week 15	Exercises and Discussion
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Electronic components & Analog and Digital Signals
Week 2	(V – I) Characteristics of P-N Junction Diodes 1
Week 3	P-N Junction Diodes 2
Week 4	Discussion
Week 5	Half-Wave Rectifier
Week 6	Center-Tapped Full-Wave Rectifier
Week 7	Mid Exam
Week 8	Rectifier part 2
Week 9	Full-Wave Bridge Rectifier (FWBR)
Week 10	Smoothing Half-Wave Rectifier Output
Week 11	Discussion
Week 12	Smoothing Full-Wave Rectifier
Week 13	Zener Diode
Week 14	Transistor
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Electronic Devices, Thomas L. Floyd, 9th Ed., Pearson Education international, New Jersey,	No but it is available as PDF

	2012..	
Recommended Texts	Basic Electronics for Scientists and Engineers, Dennis L. Eggleston, Cambridge Uni. Press, UK., 2011	No but it is available as PDF
Recommended Texts	Introduction to Electronics, Bob Zulinski, Michigan Technological University, 2nd Ed., 1999.	
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.				