



Ministry of Higher Education and
Scientific Research - Iraq
Al-Mansour University College
Department of Communication Engineering



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronic Physics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> L Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	COM12108		
ECTS Credits	6		
SWL (hr./sem)	150		
Module Level	UGI	Semester of Delivery	
Administering Department	BSc - COMM	College	Al-Mansour University College
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	15/06/2023	Version Number	1.0



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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

<p>Module Objectives أهداف المادة الدراسية</p>	<p>1-During the school year, the student learns an idea about the atomic structure, energy levels, and conductivity of minerals</p> <p>2- The student will be introduced to semiconductors and diodes, their types and applications in the field of communication science, and an understanding of electronic circuits and the most important electronic elements included in the designs of these circuits.</p> <p>3- The study material aims to develop the student's mind and enable him to visualize the transmission of information and the foundations of establishing various electrical circuits.</p> <p>4- Teaching this subject is the consolidation of the theoretical principles and foundations that depend on the creation of any electronic electrical circuit and its absolute understanding.</p>
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>This course is intended for teaching the basic principle of electronic physical for engineering students at the beginning graduate level. The course will have these important outcomes:</p> <ol style="list-style-type: none"> (1) Understanding Energy Levels and Atomic Structure ; (2) Recognize how electricity works in electrical circuits. (3) List the various terms associated with electrical circuits. (4) Discuss the reaction and involvement of atoms in electric circuits. (5) Describe electrical conductivity, charge, and current. (6) Define Ohm's law. (7) Learn and understand the basics of transmitting electromagnetic signals through different mediums (8) Learn and understand the basics of creating electrical waves (9) Understanding the operating principle of Semiconductor, P-N Junction (10) the students will learn Rectifiers, and its types



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	<p>(11) Explain the diode Circuit Applications and other Types of Semiconductor Diodes; such as Zener diodes voltage regulators, clipping circuits, clamping circuits and wave form generation,</p> <p>(12) Understanding the waveform change of diode clipping and clamping circuits and Calculate and explain DC current-voltage behavior of diodes and BJTs</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Part A - The atom models, wave nature of light, dual nature of matter, energy – band theory of metals, insulators and Semiconductors and explain the influence of excess minority carrier recombination of the performance of the devices.(7 hrs.)</p> <p>Part B- p-n junction in equilibrium, current-voltage characteristics, charge control decryption of a diode transition and diffusion capacitance, diode switching Times, diode models, small-signal model and load line concept. (12 hrs.)</p> <p>Part c-, the students will learn Rectifiers, Zener diodes voltage regulators, clipping circuits, clamping circuits and wave form generation, Varactor diode, tunnel diode, photodiode and photovoltaic (solar)cell, Light Emitting diode, principle and operation of semiconductor laser, metal Electronic Palasisics semiconductor diode. On the last objective explain the waveform change of diode clipping and clamping circuits and the function of each one. (10 hrs.)</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<ol style="list-style-type: none"> 1-Encourage the student to think about ways of generating the electromagnetic wave 2- Encourage the student to think about the importance of the frequency and energy of the wave and the time periods. 3- Encourage students’ participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students. 4- Urge the student to think about the factors affecting wave transmission in the media. 5- Enable students to link theories to the practical reality of electrical circuits. 6- Enable students to pass professional exams organized by local or international bodies. 7- Enabling students to continue self-development after graduation. 8- Setting up special seminars for students for the purpose of self-development of their personalities.



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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	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
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	2	10% (10)	2 and 12	LO #1, #3, #5, #6,, 9, #10, #11,12
	Assignments	2	10% (10)	2 and 12	LO #9, #10 and #11, #12
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #1, #9 and #10,11
Summative assessment	Midterm Exam	2hr	10% (10)	10	LO #1 - #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Material Covered



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Week 1	The models of atoms: Explain the models of atoms and the mathematical equations of each model
Week 2	Dual nature of matter: Studying the dual nature of light and their mathematical relations, especially electromagnetic waves
Week 3	Energy-band theory of metals Insulators and Semiconductors: The theory of energy bands in conductors, insulators and semiconductors and the difference between them
Week 4	Internal structure of materials cell packing: Internal arrangement of various materials Metals, insulators and semiconductors
Week 5	Bragg's law and x-ray diffraction: The importance of Bragg's law in the study of x-ray diffraction
Week 6	Electronic ballistics, Hall effect electronic ballistics, Hall effect: The effect of electric and magnetic fields on electron movement and the Hall effect
Week 7	Mobility and conduction, energy distribution of electrons: Mobility, conductivity and energy distribution study of semiconductors
Week 8	Diffusion and drift motion and Carrier life time: Explanation of the phenomena of diffusion and drift
Week 9	Semiconductors materials: Fermi-level in semiconductor: Semiconductor materials and Fermi level study of these materials and Study the types of semiconductors and the difference between them
Week 10	p-n junction in equilibrium, current-voltage characteristics: Studying the P-N junction and its voltage and current characteristics
Week 11	Small-signal model and load line concept: Studying the model of the minimum signal and the concept of the load line
Week 12	Rectifiers and the types of rectifiers: Study the rectifier and its types
Week 13	Types of Diodes: study the types of diodes used in electrical circuits, especially communication circuits, and the characteristics of each of them
Week 14	Clipping circuits and wave form generation: Study clipping circles and clamping circles, and configure the output waveform through circuit applications
Week 15	Transistor biasing PNP, NPN, FET: A study of the types of transistor bias PNP, NPN, FET
Week 16	Preparatory week before the final Exam



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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electrical and magnetic properties of materials Electrical and magnetic properties of materials	Yes
Recommended Texts	1. M.S. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley & Sons 2. S.M. Sze, Semiconductor Devices, Wiley & Sons	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/physical electronics	

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.