



Ministry of Higher Education and
Scientific Research - Iraq
University of Diyala
College of Engineering
Department of Chemical 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 checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	EE 107			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level		Semester of Delivery		
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Hassan Jasim Mohammed		e-mail	hassanjasim@uodiyala.edu.iq
Module Leader's Acad. Title	Assist. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (Hassan Jasim Mohammed)		e-mail	hassanjasim@uodiyala.edu.iq
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/010/2023		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

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To develop problem solving skills and understanding of electronics theory through the application of techniques. 2. To understand Atomic structures and energy level. 3. To understand voltage, current and electronics device from a given circuit. 4. This course deals with the basic concept of semiconductors materials. 5. This is the basic subject for all semiconductors and electronic circuits. 6. To understand diode circuit and semiconductor problems.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <ol style="list-style-type: none"> 1. Recognize base of Atomic structures. 2. List the various terms associated with electronics. 3. Summarize what is meant by a basic Energy Levels and Atomic Structure. 4. Describe the Electrical Conduction in Metals. 5. Describe electrical power, charge, and current. 6. Discuss Mobility and Conductivity, Energy Distribution of Electrons, 7. Identify the basic Semiconductors Materials. 8. Discuss the (Si , Ge and Compound Semiconductors) , Extrinsic Semiconductors. 9. Discuss the various properties Semiconductor p – n Junction. 10. Explain the Current – Voltage Characteristics, Charge Control Description of a Diode. 11. Identify the Other types of semiconductor diodes. 12. Half wave and Full wave rectifier ,clipping and clamping circuit.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Atomic Theory</u> Atom, Models, Wave Nature of Light, Dual Nature of Matter, Wave Function, Heisenberg's Uncertainty Principle, Energy – Band Theory of Metals, Insulators and Semiconductors, Crystal Structure, Ionic, Covalent and Metallic Bonding, Energy Hand of Crystals. Internal Structure of Materials Cell, Packing Miller Indices, Crystal Planes and Directions, Braggs Law and x – ray Diffraction Electronic Ballistics. [15 hrs]</p> <p>Mobility and Conductivity, Energy Distribution of Electrons, Fermi Level, Work Function. [10 hrs]</p> <p>Semiconductors Materials (Si , Ge and Compound Semiconductors) , Extrinsic Semiconductors, Fermi – Level in SemiConductor , Diffusion and Carrier Life Time , Hall Effect. [15hrs]</p> <p>p-n Junction in Equilibrium, Current – Voltage Characteristics, Charge Control Description of a Diode Transition and Diffusion Capacitances, Diode Switching Times, Diode Models, Small – Signal Model and Load Line Concept, Introduction to Heterojunctions and Double Heterojunctions [15 hrs]</p>

Varactor Diode, Tunnel Diode, Photodiode and Photovoltaic (Solar) Cell, Light – Emitting Diode, Principle and Operation of Semiconductor Laser. Electronic Ballistics Semiconductor Diode. [10hrs]
Half wave and Full wave rectifier, clipping and clamping circuit. [10hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

Type something like: The main strategy that will be adopted in delivering this module is to 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.

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects/seminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #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)

المناهج الاسبوعي النظري

	Material Covered
Week 1	The Atom, Models, Wave Nature of Light, Dual Nature of Matter, Wave Function, Heisenberg's Uncertainty Principle.
Week 2	Energy – Band Theory of Metals, Insulators and Semiconductors, Crystal Structure, Ionic.
Week 3	Covalent and Metallic Bonding, Energy Band of Crystals. Internal Structure of Materials Cell.
Week 4	Packing Miller Indices, Crystal Planes and Directions, Braggs Law and x – ray Diffraction Electronic Ballistics.
Week 5	Mobility and Conductivity.
Week 6	Energy Distribution of Electrons, Fermi Level, Work Function.
Week 7	Introduction Semiconductors Materials (Si , Ge and Compound Semiconductors).
Week 8	Extrinsic Semiconductors , Fermi – Level in Semiconductor.
Week 9	Diffusion and Carrier Life Time , Hall Effect .
Week 10	p-n Junction in Equilibrium , Current – Voltage Characteristics.
Week 11	Charge Control Description of a Diode Transition and Diffusion Capacitances, Diode Switching Times.
Week 12	Diode Models , Small – Signal Model and Load Line Concept.
Week 13	Varactor Diode, Tunnel Diode, Photodiode and Photovoltaic (Solar) Cell, Light – Emitting Diode.
Week 14	Principle and Operation of Semiconductor Laser. Electronic Ballistics Semiconductor Diode.
Week 15	Half wave and Full wave rectifier ,clipping and clamping circuit.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to physical Electronics By: Bill Wilson	Yes
Recommended Texts	فيزياء الالكترونيات, د. صبحي سعيد	No
Websites	https://www..edouniversity.edu.ng/oer/lecturenotes/electrical-electronic-engineering	

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
<p>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.</p>				