

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Physics of Semiconductor Devices		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input checked="" type="checkbox"/> Seminar
Module Code	ICE103		
ECTS Credits	4		
SWL (hr/sem)	90		
Module Level	1 st	Semester of Delivery	
Administering Department	ICE	College	KHW
Module Leader	Omar Yousif	e-mail	Omar.yousif@kecbu.uobaghdad.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Nil	e-mail	Nil
Peer Reviewer Name	Nil	e-mail	Nil
Scientific Committee Approval Date	Jun-2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	Electronic Syst.s (2 nd level)	Semester	2 nd

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. Understanding the fundamental concepts, principles and theories of Semiconductors; 2. Learn the basic fundamentals of different semiconductor devices used in modern electronic design.; 3. Learn to analyze their characteristics & biasing properties. 4. To review of modern applications in this field.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Solving additional, more challenging exam problems. 2. Learn basic concepts of semiconductors (manufacturing, doping); 3. Learn how different semiconductor devices are manufactured. 4. Understand the characteristics and operation of electronic devices; 5. Analyze different electronic ccts formed from semiconductor devices ; 6. Understand the basic concept of modern digital IC's.
Indicative Contents المحتويات الإرشادية	<p><u>Part A – Semiconductors & Diodes</u> Band theory, electric c/cs of materials, current in semiconductors, N-type & P-type semiconductors, PN-Junction, Diodes applications. [15 hrs]</p> <p><u>Part B- Bipolar Junction Transistors (BJTs)</u> BJT structure, Basic BJT Operation, BJT Characteristics and Parameters , BJT biasing, BJT as an Amplifier , The BJT as a Switch. [15 hrs]</p> <p><u>Part C- Field Effect Transistors (MOSFET)</u> MOSFET structure, Basic BJT Operation, MOSFET Characteristics and Parameters , MOSFET biasing, MOSFET as an Amplifier , The MOSFET as a Switch. [15 hrs]</p> <p><u>Part D- Semiconductor IC Concepts</u> BJT logic gates, BJT Current mirror cct, CMOS , analog & digital Switch, CMOS logic gates, CMOS Current mirror cct. [15 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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.</p>
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	45	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	145		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6,
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
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 to Semiconductors
Week 2	PN junction diode
Week 3	Diode characteristics
Week 4	Diode cct. modeling & applications
Week 5	BJT structure, parameters, characteristics & operation
Week 6	BJT dc biasing & load-line
Week 7	BJT as an amplifier
Week 8	Mid-term Exam
Week 9	MOSFET structure & types, response characteristics

Week 10	Enhancement MOSFET , Depletion MOSFET
Week 11	MOSFET as an amplifier
Week 12	BJT logic gates, BJT Current mirror cct, ,
Week 13	CMOS , analog & digital Switch
Week 14	CMOS logic gates
Week 15	CMOS Current mirror cct
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Diode c/cs
Week 2	Diode rectifier and clamper
Week 3	BJT biasing & Amp.
Week 4	BJT logic gates
Week 5	BJT current mirror
Week 6	CMOS biasing & Amp.
Week 7	CMOS logic gates

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Devices ", Thomas L. Floyd, Eighth Edition, 2008	Yes
Recommended Texts	" Electronic Devices & Circuit Theory", R. Boylestad, L. Nashelskey :" Microelectronic circuit", Adel Sedra , Smith " Electronic Devices & Circuit Theory", R. Boylestad, L. Nashelskey " Electronic Devices & Circuit", J. Millman	No
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.