MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Electronic Fundamentals**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2104**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	CET	
Module Leader	Zahraa Mohammed Salah		**e-mail**	zahraamohammed85@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Zahraa Mohammed Salah		**e-mail**	zahraamohammed85@gmail.com	
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Scientific Committee Approval Date	16/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET1202	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand materials conductivity, semiconductor materials, and types 2. This is the basic subject for all electronic circuits and devices. 3. This course deals with first and the simplest semiconductor device, diode, diode physical construction, biasing, characteristics, application circuits and Zener 4. Mathematical derivation and implementation of the load line analysis, and Q point with in diode characteristics curve to develop problem solving skills and understanding of diode circuits 5. This course deals with second semiconductor device, BJT This course deals with BJT physical construction, biasing, configuration methods, input and output characteristics 6. To understand the D.C biasing of BJT and circuit types , analysis and calculations of BJT parameters 7. To understand and construct re model for BJT circuits 8. To deal with small signal analysis of BJT
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize classifications of materials according to its conductivity. 2. Identify the semiconductor material characteristics and classifications 3. Recognize the physical structure and properties of P and N layers 4. Identify diode as a first example of semiconductor devices. 5. Discuss diode physical construction, biasing, and characteristics 6. Identify the variable parameters of diodes, and V threshold 7. Summarize what is meant by Load line analysis , and Q point 8. Identify the applications of diodes in electrical circuits using AC. And DC. Power supplies 9. To understand the concept of Zener region and the differences between zener and original diodes 10. To solve zener circuits and calculate its voltage current with different cases 11. To understand and discuss the second semiconductor device which is Transistor (Bipolar Junction Transistor)(BJT) 12. To discuss BJT physical construction, Operation, and configuration methods 13. To understand and implement input and output Characteristics of each configuration method and load line and Q point implementations 14. To implement and solve BJT biasing circuit types and calculations of important parameters of BJT in DC. Biasing state 15. Design BJT circuit types by using Quesent point parameters 16. Understand and construct re model for BJT circuits 17. Derive and calculate Zi, Zo Av and AI from re model of BJT circuits 18. Understand and calculate small signal analysis of BJT .

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Semiconductor Materials Energy Levels , n- and p-Type, Semiconductor Diode Construction ,biasing, Characteristics and Zener Diodes, Load-Line Analysis [8 hrs] . Series Diode Configurations with DC Inputs, Parallel and Series-Parallel Configurations Sinusoidal Inputs Half-Wave Rectification, Full-Wave Rectification Clippers ,Clampers , Zener Diodes Voltage-Multiplier Circuit [10hrs] Transistor Construction , Transistor Operation ,Common-Base Configuration Transistor Amplifying Action ,Common-Emitter Configuration ,Common-Collector Configuration ,Limits of Operation [8hrs] Operating Point, Fixed-Bias Circuit , Emitter-Stabilized Bias Circuit , Voltage-Divider Bias , DC Bias with Voltage Feedback , Miscellaneous Bias Configurations, Design Operations Transistor Switching Networks, [[15 hrs] Revision problem classes [12 hrs] BJT Transistor Modeling The Important Parameters: Zi, Zo, A v, A i The r e Transistor Model The Hybrid Equivalent , small signal analysis Common-Emitter Fixed-Bias Configuration , Voltage-Divider Bias CE Emitter-Bias Configuration Emitter-Follower Configuration Common-Base Configuration[11 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على(15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Semiconductor Materials, Energy Levels , Extrinsic Materials—n- and p-Type
Week 2	Semiconductor Diode construction, biasing, characteristics, Zener region
Week 3	Load-Line Analysis, RESISTANCE LEVELS, DIODE EQUIVALENT CIRCUITS
Week 4	Series Diode Configurations with DC Inputs , Parallel and Series- Parallel Configurations
Week 5	Sinusoidal Inputs; Half-Wave Rectification, Full-Wave Rectification
Week 6	**Midterm Exam**
Week 7	Clipper's series and parallel ,Clampers , Zener Diodes, Introduction , Transistor Construction
Week 8	Transistor Operation, Common-Base Configuration Transistor, Amplifying Action , Common-Emitter Configuration , Limits of Operation
Week 9	Operating Point, Fixed-Bias Circuit ,Emitter-Stabilized Bias Circuit ,
Week 10	Voltage-Divider Bias , DC Bias with Voltage Feedback , Miscellaneous Bias Configurations
Week 11	Design Operations , Transistor Switching Networks
Week 12	Amplification in the AC Domain, BJT Transistor Modeling ,The Important Parameters: Zi, Zo, A v, A The re Transistor Model
Week 13	Small signal analysis
Week 14	Common-Emitter Fixed-Bias Configuration Voltage-Divider Bias
Week 15	CE Emitter-Bias Configuration Emitter-Follower Configuration Common-Base Configuration

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: Diode characteristics
Week 3	Lab 3 Zener diode characteristics
Week 4	Lab 4 Half wave rectifier
Week 5	Lab 5: full wave rectifier
Week 6	Half anf full wave rectifire with filter
Week 7	Lab 7: clippers

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electronic devices and circuit theory Poylested	Yes
Recommended Texts	.	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.