

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electronic Circuits		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CET2205			
ECTS Credits	5			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		4
Administering Department	CET	College	EETC	
Module Leader	Rawaa Abdulridha Kadhim		e-mail	Rawaa84ha@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	MSc.	
Module Tutor	Omar Ibrahim Mustafa		e-mail	omar.ibrahim@mtu.edu.iq
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Scientific Committee Approval Date	13/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET2104	Semester	3
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. This course deals with Third semiconductor or device, FET physical construction, biasing, configuration s , output and transfer characteristics 2. To understand the D.C biasing of BJT and circuit types , analysis and calculations of FET parameters 3. To understand and construct re FET modeling, and circuits analysis 4. To deal with small signal analysis of FET 5. Deals with Depletion-Type MOSFET , and Enhancement-Type MOSFETs and Combination ,and Design 6. Deals with Operational amplifiers (OP_AMP) their advantages, classifications and types and application circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To understand and discuss the third semiconductor device which is Transistor (Field Effect Transistor)(FET), Construction and Characteristics of JFETs 2. To Identify and Calculate And implement Transfer Characteristics of FET 3. To Identify and discuss Important Relationships 227 5.7 Depletion-Type MOSFET 228 5.8 Enhancement-Type MOSFET , MOSFET Handling , VMOS CMOS 4. To implement and solve FET DC biasing and circuits analysis Fixed-Bias Configuration Self-Bias Configuration Voltage-Divider Biasing, implementations 5. To understand Depletion-Type MOSFETs Enhancement-Type MOSFETs 6. To identify and implement Combination Networks , Design P-Channel FETs Universal JFET Bias Curve . 7. To understand FET small signal Model, 8. To Identify, Calculate and analyses JFET Fixed-Bias Configuration , JFET Self-Bias Configuration , JFET Voltage-Divider Configuration , 9. To understand JFET Source-Follower (Common-Drain) Configuration , JFET Common-Gate Configuration , 10. To identify Depletion-Type MOSFETs, Enhancement-Type MOSFETs E-MOSFET Drain-Feedback Configuration, 11. To Understand and implement E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks. 12. To understand and identify Operational amplifiers (Introduction) , Differential and Common-Mode Operation 13. To understand Op-Amp, Practical Op-Amp Circuits , and Op-Amp Specifications 14. To identify DC Offset Parameters, Op-Amp Specifications and Frequency Parameters 15. To understand and identify OP AMP applications circuits.

	16. To Analyze, calculate and implement Constant-Gain Multiplier, Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. FET (Field Effect Transistor) (FET), Construction and Characteristics of JFETs, Transfer Characteristics of FET , Important Relationships Depletion-Type MOSFET Enhancement-Type MOSFET , MOSFET Handling , VMOS CMOS [8hrs] . FET D.C. biasing and circuits analysis Fixed-Bias Configuration, Self-Bias Configuration , and Voltage-Divider Biasing, implementations [8 hrs] Depletion-Type MOSFETs Enhancement-Type MOSFETs, Combination Networks , Design, and P-Channel FETs Universal JFET Bias Curve [10hrs]. FET small signal Model, JFET Fixed-Bias Configuration , JFET Self-Bias Configuration , JFET Voltage-Divider Configuration [8hrs]. JFET Source-Follower (Common-Drain) Configuration , JFET Common-Gate Configuration , Depletion-Type MOSFETs , Enhancement-Type MOSFETs E-MOSFET Drain-Feedback Configuration, Voltage-Divider Configuration ,and Designing FET Amplifier Networks . [12hrs] 2. Operational amplifiers (OP_AMPS) Operational amplifiers (Introduction) , Differential and Common-Mode Operation Op-Amp introduction , Practical Op-Amp Circuits , and Op-Amp Specifications DC Offset Parameters , Op-Amp Specifications and Frequency Parameters [8 hrs] OP AMP applications circuits Constant-Gain Multiplier , Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters[6 hrs]

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.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6
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, 10,	LO # 1-6 , LO # 6-11
	Assignments	2	10% (10)	5, 10	LO # 8, 14
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO #1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction ,Field effect transistor FET, Introduction , CONSTRUCTION AND CHARACTERISTICS
Week 2	TRANSFER CHARACTERISTICS, Applying Shockley's Equation, and short hand method
Week 3	DEPLETION-TYPE MOSFET, Basic Construction, c Operation and Characteristics
Week 4	p-Channel Depletion-Type MOSFET, ENHANCEMENT-TYPE MOSFET, Basic construction
Week 5	Enhancement MOSEFET Basic Operation and Characteristics, MOSFET HANDLING
Week 6	FET DC. Biasing , FIXED-BIAS CONFIGURATION,
Week 7	FET SELF-BIAS CONFIGURATION, VOLTAGE-DIVIDER BIASING
Week 8	DEPLETION-TYPE MOSFETs, ENHANCEMENT-TYPE MOSFETs
Week 9	DESIGN
Week 10	FET SMALL-SIGNAL MODEL, Graphical Determination of gm, Mathematical Definition of gm
Week 11	FET AC Equivalent Circuit, JFET VOLTAGE-DIVIDER CONFIGURATION, JFET SOURCE-FOLLOWER (COMMON-DRAIN) CONFIGURATION,
Week 12	JFET COMMON-GATE CONFIGURATION, DEPLETION-TYPE MOSFETs, ENHANCEMENT-TYPE MOSFETs
Week 13	Operational amplifier, DIFFERENTIAL AND COMMONMODE OPERATIO, OP-AMP BASICS
Week 14	Operational amplifier applications
Week 15	Operational amplifier applications
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي المختبر

	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: Clampers
Week 3	Lab 3 Input characteristic of CBC BJT
Week 4	Lab 4 output characteristic of CBC BJT
Week 5	Lab 5: Input characteristic of CEC BJT
Week 6	Lab 6: output characteristic of CEC BJT
Week 7	Lab 7:review

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.