Ministry of Higher Education and Scientific Research – Iraq
Alfurat Al-Awsat technical university
technical college Al-musaib
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	**ELECTRONIC ESSENTIALS**	**Module Delivery**	
Module Type	CORE	✓ **Theory** **Lecture** ✓ **Lab** **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	ATU23032		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	٢	**Semester of Delivery**	1
Administering Department	**DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES**	**College**	**ALFURAT AL-AWSAT TECHNICAL UNIVERSITY TECHNICAL COLLEGE AL-MUSAIB**
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	None	**e-mail**	None
Peer Reviewer Name	None	**e-mail**	None
Review Committee Approval	14/06/2023	**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

Module Objectives أهداف المادة الدراسية	1- Understanding the Basics: The primary objective of the Electronic Basic course is to provide students with a solid foundation in the basic principles of how electronic circuits work and how they are made from semiconductor materials. 2-Analyzing Circuit Components: Students will understand how the p-n junction is formed and how it is manufactured, as well as understanding and analyze the electronic circuits in which the diode is included, like as rectifier circuit , clipping circuit ,clamper circuit, and others. the student will also learn the principle of operation of BJT transistor 3-Circuit Laws and Theorems: Students will become familiar with important laws and theorems governing the diode and transistor applications circuits. They will gain proficiency in applying these principles to solve complex circuit problems. 4-Circuit Simulation and Design: The course may involve introducing students to circuit simulation software. They will learn how to use simulation tools to analyze and design electronic circuits, verify their calculations, and gain practical insights into circuit behavior. 5-Problem-Solving Skills: An important objective is to develop students' problem-solving skills in the context of electronic circuits. They will learn how to analyze circuit diagrams,

	formulate appropriate strategies, and apply their knowledge to solve a variety of circuit problems efficiently. 6-Laboratory Skills: The course includes hands-on laboratory experiments to provide students with practical experience in building, testing, and troubleshooting electronic circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Fundamental Knowledge: Students will acquire a solid understanding of the fundamental concepts and principles of electronic circuits that's contain diode and transistor. 2-Circuit Analysis Skills: Students will develop the ability to analyze electronic circuits such as rectifier circuit , clipping circuit , clamper circuits, Zener circuits , and amplifier circuits 3-Circuit Design and Simulation: Students will be able to design and simulate electronic circuits, using appropriate components and considering design constraints. They will learn to use circuit simulation software to verify their designs, analyze circuit performance, and troubleshoot circuit issues. 4-Laboratory Skills: Through hands-on laboratory experiments, students will develop practical skills in building, testing, and troubleshooting electronic circuits. They will become proficient in using measuring instruments, interpreting experimental data, and ensuring safety precautions while working with electrical circuits. 5-Critical Thinking and Analysis: The course will promote critical thinking and analytical skills among students. They will learn to evaluate different circuit solutions, analyze circuit behavior, and make informed decisions based on their understanding of electronic circuits. By the end of the course, students will possess a comprehensive knowledge of electronic circuits, enabling them to analyze, design, and troubleshoot a wide range of electrical circuits. They will be prepared for further studies in electrical engineering or related fields and equipped with skills that can be applied in professional practice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – semiconductor device. The composition of the atoms and materials used in the manufacture of semiconductor materials and the specifications of each material. In addition to that, how to form the p-type semiconductor and the N-type semiconductor, and how to manufacture the diode .[12 hrs] • Part B - diode circuits. Rectifier circuits, clipping circuits, clamper circuits. Multiplier circuits. [16 hrs] • Part C - zener and transistor circuit zener regulator circuits, the LED circuit, the Photo diode circuit. And bjt circuits. [26 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1-**Hands-on Experiments:** Engage students in practical experiments to deepen their understanding of circuits. 2-**Simulation Software:** Use circuit simulation software for virtual circuit design and analysis. 3-**Problem-solving Exercises:** Include various problem-solving exercises to apply circuit analysis techniques. 4-**Group Projects:** Assign collaborative projects for circuit design and construction. 5-**Real-world Applications:** Discuss practical applications of circuits in different devices and systems. 5-**Interactive Discussions:** Encourage student participation and critical thinking through open-ended questions. 6-**Conceptual Understanding:** Focus on intuitive understanding alongside mathematical analysis.

	7-**Assessment Variety:** Use diverse assessment methods to gauge student understanding. 8-**Office Hours and Support:** Offer individualized assistance through office hours or online support.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	5, 10	LO #1, 2, 5
	Assignments	8	10% (10)	2, 12	LO # 3, 4
	Projects / Lab.	8	10% (10)	Continuous	All
	Report	7	10% (10)	2, 12	LO # 5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-5
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
١	**Semiconductors materials**
٢	**PN junction, introduction and characteristics**
٣	**Diode applications , clipping circuit**
٤,٥	**Clamper circuit , voltage doubler ,voltage tripler and voltage quadreplier**
٦,٧	**half wave rectifier and full wave bridge rectifier**
٨	**Filter circuits for half wave and full wave**
٩	**Center-tapped rectifier**
١٠, ١١	**Special purpose diodes (Zener diode , photo diode, LED)**
١٢	**Introduction to Bipolar Junction Transistors (BJT)**
١٣	**BJT circuit analysis and characteristics**
١٤	**Field effect transistor FET (Introduction and characterstics)**
١٥	**Final Examination**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
١	**LAB ١: DIODE CHARACTERISTICS**
٢	**LAB ٢: CLIPPING CIRCUITS**
٣	**LAB ٣: CLAMPER CIRCUITS**
٤	**LAB ٤: VOLTAGE DOUBLER**

٥	LAB ٥: VOLTAGE TRIPLER AND QUADREPIER
٦	LAB ٦: RECTIFIER CIRCUITS , HALF WAVE RECTIFIER , FULL WAVE BRIDGE RECTIFIER
٧	LAB ٧: HALF WAVE RECTIFIER AND FULL WAVE BRIDGE RECTIFIER WITH FILTER
٨	LAB ٨: CENTER TAPED RECTIFIER
٩	LAB ٩: ZENER DIODE CHARACTERISTICS
١٠	LAB ١٠: ZENER DIODE REGULATION AND CLIPPING
١١	LAB ١١: BIPOLAR JUNCTION TRANSISTORS (BJT) CHARACTERISTICS
١٢	LAB ١٢: BJT SMALL SIGNAL AMPLIFIER
١٣	LAB ١٣: FIELD EFFECT TRANSISTOR FET CHARACTERISTICS
١٤	LAB ١٤: REVIEW

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas L. Floyd "Electronic Devices Conventional Current Version"	Yes
Recommended Texts	Robert L. Boylestad , Louis Nashelsky "Electronic Devices and Circuit Theory"	No
Websites		

APPENDIX:

GRADING SCHEME
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	مقبول بقرار	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note:

NB Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. 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.