

## COURSE PLAN

### FIRST: BASIC INFORMATION

College					
College	: Karak College				
Department	: Engineering Department.				
Course					
Course Title	: Electronic Circuit I				
Course Code	: 020406211				
Credit Hours	: 2 (1 Theoretical, 1 Practical)				
Prerequisite	: 020406112				
Instructor					
Name	:				
Office No.	:				
Tel (Ext)	:				
E-mail	:				
Office Hours	:				
Class Times					
Text Book					
<b>Electronic Circuit I, Al-Balqa Applied University &amp; KOICA, 2022</b>					

### References

- Adel Sedra et al., “**Microelectronic Circuits**” 8th Ed., Oxford University Press, 2019.
- Robert Boylestad, “**Electronic Devices and Circuit Theory**” 11th Ed., Pearson, 2014.

### SECOND: PROFESSIONAL INFORMATION

#### COURSE DESCRIPTION

This course explains the basic characteristics and operations of semiconductor devices including diode, bipolar junction transistor and field effect transistor, which are the basic components used to build practical electronic circuits. It also deals with equivalent circuits for the circuits with semiconductor devices to test any analyze the behavior of them.

#### COURSE OBJECTIVES

- **Explain** the creation of diodes and transistors.
- **Explain** the characteristics of diode, BJT/JFET/MOSFET.
- **Explain** the bias of diode and transistors.
- **Explain** the behavior of the circuits with diodes.
- Determine suitable electronic components needs for the application.

### COURSE LEARNING OUTCOMES

By the end of the course, the students will be able to:

- CLO1. Explain the characteristics of electronic components based on semiconductor
- CLO2. Identify the operating principles and characteristics of diodes and transistors
- CLO3. Explain the equivalent circuit for the diode
- CLO4. Examine the diode applications
- CLO5. Determine the calculations of the circuit values including diodes or transistors
- CLO6. Explain the special types of diodes and their uses
- CLO7. Examine the voltage regulator circuits and their working methods
- CLO8. Evaluate the operation of the BJT transistor and determine its characteristics
- CLO9. Evaluate the operation of the FET transistor and determine its characteristics

### COURSE SYLLABUS

Week	Topic	Topic details	Related LO	Proposed assignments
1	Semiconductors	<ul style="list-style-type: none"> <li>• Conductor, insulator, and semiconductor</li> <li>• Intrinsic Semiconductors.</li> <li>• Doped Semiconductors.</li> </ul>	CLO1	
2	Semiconductors	<ul style="list-style-type: none"> <li>• Drift current and diffusion current.</li> <li>• Relationship between diffusion constant and mobility.</li> <li>• Electrons versus hole flow.</li> <li>• Energy levels.</li> </ul>	CLO1	
3	P-N junction	<ul style="list-style-type: none"> <li>• P-n junction Physical Structure.</li> <li>• Operation with Open-Circuit Terminals.</li> <li>• Majority and minority carriers.</li> </ul>	CLO2	
4	P-N junction	<ul style="list-style-type: none"> <li>• Qualitative Description of Junction Operation.</li> <li>• The Current–Voltage Relationship of the Junction.</li> <li>• Reverse Breakdown.</li> </ul>	CLO2	
5	P-N junction	<ul style="list-style-type: none"> <li>• The p-n Junction with an Applied Voltage.</li> <li>• Capacitive Effects in the p-n Junction.</li> <li>• Diode characteristic curve.</li> </ul>	CLO2	
6	Diodes	<ul style="list-style-type: none"> <li>• The Ideal Diode Current–Voltage Characteristic.</li> <li>• Limiting circuit</li> <li>• Protection Circuit</li> </ul>	CLO3	
7	Diodes	<ul style="list-style-type: none"> <li>• The Forward-Bias Region.</li> <li>• The Reverse-Bias Region.</li> <li>• The Breakdown Region.</li> <li>• Modeling the Diode.</li> <li>• The Voltage Doubler.</li> </ul>	CLO4	
8		<b>Mid exam</b>		
9	Diodes	<ul style="list-style-type: none"> <li>• Half-wave Rectifier.</li> <li>• Full-wave Rectifier.</li> </ul>	CLO5	

Week	Topic	Topic details	Related LO	Proposed assignments
		<ul style="list-style-type: none"> <li>The Bridge Rectifier.</li> <li>The Rectifier with a Filter Capacitor.</li> </ul>		
10	light emitting diode	<ul style="list-style-type: none"> <li>Light-Emitting Diodes (LEDs).</li> <li>Photodiodes.</li> <li>Varactors.</li> </ul>	CLO6	
11	Zener diode	<ul style="list-style-type: none"> <li>Zener diode</li> <li>Zener diode in forward biased.</li> <li>Zener diode in reverse biased.</li> <li>Voltage regulation circuits.</li> </ul>	CLO7	
12	BJT (Bipolar Junction Transistor)	<ul style="list-style-type: none"> <li>Simplified Structure and Modes of Operation.</li> <li>Operation of the n-p-n Transistor in the Active Mode.</li> <li>Structure of Actual Transistors.</li> <li>Operation in the Saturation Mode.</li> <li>The p-n-p Transistor.</li> </ul>	CLO8	
13	BJT (Bipolar Junction Transistor)	<ul style="list-style-type: none"> <li>Circuit Symbols and Conventions.</li> <li>Graphical Representation of Transistor Characteristics.</li> <li>Current–Voltage Characteristics.</li> <li>Transistor Breakdown.</li> <li>Dependence of Beta on collector current and Temperature.</li> </ul>	CLO8	
14	FET (Field Effect Transistor)	<ul style="list-style-type: none"> <li>Device Structure.</li> <li>Creating a Channel for Current Flow.</li> <li>Operation of FET</li> <li>p-Channel and n-channel MOSFET.</li> </ul>	CLO9	
15	FET (Field Effect Transistor)	<ul style="list-style-type: none"> <li>Circuit Symbol.</li> <li>Current characteristics of FET</li> <li>MOSFET Circuits at DC.</li> </ul>	CLO9	
16		<b>Final exam</b>		

### COURSE LEARNING RESOURCES

Teaching will be achieved using available resources including lectures, data show, and materials uploaded on the e-learning system.

### ONLINE RESOURCES

- <https://www.electronics-tutorials.ws/>
- <https://www.allaboutcircuits.com/textbook/>

### ASSESSMANT TOOLS



Assessment Tools	%
Projects and Quizzes	20%
MID Exam	30%
Final Exam	50%
Total Marks	100%

### THIRD: COURSE RULES

#### ATTENDANCE RULES

Attendance and participation are extremely important, and the usual University rules will apply. Attendance will be recorded for each class. Absence of 10% will result in a first written warning. Absence of 15% of the course will result in a second warning. Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination. Should a student encounter any special circumstances (i.e. medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records.

#### GRADING SYSTEM

Example:

Grade	points
FAILED	0-49
PASSED	50-100

#### REMARKS

{ The instructor can add any comments and directives such as the attendance policy and topics related to ethics }

#### COURSE COORDINATOR

**Course Coordinator:** Eng.mahmoud aljafari

**Department Head:**

**Signature:** Eng.mahmoud aljafari

**Signature:**

**Date:**

**Date:**