FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Engineering & Technology

Basic Electronic Circuits

Information :

Course Code :	ELE 216	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Department of Mechanical Engineering

Instructor Information :

Title	Name	Office hours
Professor	Saeed Hassan Ibrahim Saeed	4
Teaching Assistant	Donia Waheed Mohamed Abdelmonem Saleem	

Area Of Study :

By the end of this course, students will be able to:
1- Characterize Semiconductor Materials;
2- Analyze the Conduction Mechanism in Semiconductors;
3- Give the Structure, Analyze, and Characterize Diodes;
4- Give the Structure, Analyze, and Characterize BJTûs;
5- Give the Structure, Analyze, and Characterize MOSFETûs;

Description :

Semiconductor devices and switching characteristics, Logic gates and families, Memory elements and types, Timing circuits, Analog / digital and digital / analog converters.

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Understand the atomic structure and the energy band diagram of semiconductor materials.
2 -	Understand the conduction mechanisms in semiconductors.
3 -	Know and Classify different diode structures.
4 -	Know and Classify different BJTûs structures.
5 -	Know and Classify different FETûs structures.
6 -	Enumerate built-in potential, transition region capacitance, and diffusion capacitance of the PN junction.
7 -	Derive the PN junction I-V characteristics.
8 -	Implement clipping and rectifier circuits
9 -	Derive the BJT input and output characteristics.
10 -	Understand the use of BJT to amplify signals and its use as a switch
11 -	Derive the FET input and output characteristics.
12 -	Understand the Operational Amplifier Characteristics and applications
b.Intellectual Skills: :	
1 -	Compare between different kinds of diodes.

2 -	Compare between different kinds of transistors.
3 -	Analyze Diode circuits (clipper, rectifier,..etc).
4 -	Analyze BJT biasing circuits
5 -	Analyze MOSFET biasing circuits
c.Professional and Practical Skills: :	
1 -	Measure the diode I-V characteristics.
2 -	Measure the BJT input and output characteristics
3 -	Measure the FET input and output characteristics
d.General and Transferable Skills: :	
1 -	Work effectively in team.
2 -	Develop skills related to creative thinking, problem solving, oral and written communication, and teamwork

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Introduction to Semiconductor Solid State	8	4	4
Semiconductor Diode	8	4	4
Diode Models	8	4	4
Diode Circuit Applications	8	4	4
Bipolar Junction Transistor (BJT)	8	4	4
Metal Oxide Semiconductor Field Effect Transistor (MOSFET)	8	4	4
Operational Amplifier	12	6	6

Teaching And Learning Methodologies :

Interactive Lecturing
Problem solving
Experiential learning

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
1st Midterm	15.00	5	
2nd Midterm	15.00	10	
Assignments, Participation, & Quizzes	30.00		
Final Exam	40.00	16	

Recommended books :

Electronic Principles (7th edition or later), A. Malvino and D. Bates,, ISBN-10: 0073222771Lecture notes on the course Moodle page, FUE website.
Microelectronic Circuits, (5th edition), A. Sedra and J. Smith, Oxford University Press, ISBN-10: 0195338839, 2004.
Instructor notes