Faculty of Engineering & Technology

Basic Electronic Circuits

Information :

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

Department : Department of Mechanical Engineering

Area Of Study :

This course aims to:
ÅPrepare student to be aware with the semiconductor physics and general characteris-tics of semiconductor materials

ÅIntroduce the basic structure , characteristics , operation, configurations and biasing of Bipolar ï junction transistors (BJT) and the Field-Effect transistors (FET)
ÅIntroduce the principle of operation , characteristics and applications of the operation-al Amplifiers (Op-Amp) and filters.

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 -	a1. Illustrate the characteristics of Semiconductors used in electronic circuits and compo-nents.
2 -	a2. Illustrate Diodes and BJT and FET transistors DC operations.
3 -	a3. Recognize methodologies of solving electronic circuit's problems.
4 -	a4. Acquire principles of design of Diodes, BJT and FET Electronic circuits.
5 -	a5. Discuss some amplifier fundamentals
6 -	a6. Discuss the principle of operation and characteristics of the Operational Amplifier
7 -	a7. Discuss the Non-Inverting and inverting Amplifiers circuits
8 -	a8. Illustrate the characteristics of analog filters.
b.Intellectual Skills: :	
1 -	b1. Differentiate between different types of semiconductor materials.
2 -	b2- Analyze Diode circuits (clipper, rectifier,..etc.).
3 -	b3. Analyze the DC problems for BJT and MOS transistors
4 -	b4. Assess and evaluate the characteristics of different BJT and FET biasing circuits.
5 -	b5. Develop analytical models for Diodes, BJT`s and FET`s circuits.
6 -	b6. Analyze the Integrator, Differentiator, Differential Amplifier and Summing Amplifier cir-cuits
7 -	b7. Differentiate between the various first-order and second-order filters

c.Professional and Practical Skills: :	
1 -	c1. Synthesis different Diodes, BJT and FET circuits
2 -	c5. Measure the diode I-V characteristics, the BJT/FET input and output characteristics and the main characteristics of op-amp and analog filters
3 -	c4. Use MultiSim software packages to simulate the designed circuits
4 -	c3. Implement the various first-orders / second-order - passive/active filters using op amps and RC circuits.
5 -	c2. Use laboratory equipment to design Diodes, BJT`s and FET`s circuits
d.General and Transferable Skills: :	
1 -	d4 Improve the ability to manage time and resources within an individual and group projects
2 -	d3. Communicate effectively.
3 -	d2. Show the ability to present and interpret projects.
4 -	d1. Collaborate effectively within multidisciplinary team.

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 :

ÅRobert Boylestad Louis Nashelsky, "Electronic Devices and Circuit Theory", 11th editions, Pearson, ISBN-10: 0132622262, 2014
ÅCourse Notes: Lectures word notes, power point presentation and summary notes.