

**Faculty of Engineering & Technology**

**Electronic Circuits**

**Information :**

**Course Code :** ELE 364

**Level :** Undergraduate

**Course Hours :** 4.00- Hours

**Department :** Department of Electrical Engineering

**Instructor Information :**

Title	Name	Office hours
Lecturer	Ahmed Hosni Ali Mohamed Elghandour	8
Assistant Lecturer	Lamia Hamdy Ahmed Kamal Shehab Eldin	

**Area Of Study :**

The Course aims to provide :

- 1- Transistor small signal models:  $\pi$ -model , T-model.
- 2- Analysis of audio frequency (AF) amplifiers: RC-coupled, and frequency response.
- 3- Power amplifiers: Class-A, Push-pull operation (Class-A, Class-B, Class C).
- 4- Operational amplifiers (OPAMPs): difference amplifier, OPAMP specifications and frequency characteristics, OPAMP applications.
- 5- Inverting, non-inverting, adder, subtractor, integrator, differentiator. Feedback amplifiers (FB).
- 6- FB concept, general characteristics of negative FB amplifiers, input and output impedances
- 7- Oscillators: concept of stability and oscillations, OPAMP oscillators.
- 8- Multivibrators (MVs): bistable MVs, monostable and astable MVs.
- 9- Waveform shaping circuits and the 555 timer.

**Description :**

Transistor small signal model , Analysis of audio frequency (AF) amplifiers: RC-coupled, high frequency model and frequency response, AF power amplifiers: Class-A, Push-pull operation (Class-A, Class-B, Class AB), Feedback amplifiers (FB): FB concept, stability, general characteristics of negative FB amplifiers, input and output impedances with FB, difference amplifier Operational amplifiers (OPAMPs):, OPAMP specifications and frequency characteristics, OPAMP applications: inverting, non-inverting, adder, subtractor, integrator, differentiator, Oscillators: concept of stability and oscillations, OPAMP oscillators (rectangular, sinusoidal, Wien bridge, phase shift, and tuned circuits). Multivibrators (MVs): bistable MVs, triggering, schmitt trigger, monostable and astable MVs, wave shaping circuits and the 555 timer

**Course outcomes :**

**a. Knowledge and Understanding :**

1 -	understand the fundamentals of the Audio and Power transistor Amplifiers .
2 -	Operational amplifiers (OPAMPs): specifications , frequency characteristics, and applications.
3 -	Inverting, non-inverting, adder, integrator, differentiator. and feedback amplifiers (FB).
4 -	OPAMP oscillators
5 -	Multivibrators (MVs): bistable MVs, monostable and astable MVs.
6 -	development of the practical skills and testing of the electronic circuits

**b. Intellectual Skills: :**

1 -	Ability to apply different alternative solutions.
2 -	Ability to apply different solution alternatives using different approximation models.
3 -	Analysis of the obtained results both individually or as a part of a team

**c. Professional and Practical Skills: :**

1 -	Testing and measurements of the characteristics of the Transistor and Operational Amplifier circuits..
2 -	Connections and Measurements of the input and output signal levels and waveforms of the transistor and Operational Amplifier Circuits
3 -	Fault detection and repair of the OP Amplifier and transistor circuits.

**d. General and Transferable Skills: :**

1 -	Ability to write technical reports.
2 -	Ability to work in a self-directed manner.
3 -	Can work coherently as a part of a team.
4 -	Can find innovative solutions

**Course Topic And Contents :**

Topic	No. of hours	Lecture	Tutorial / Practical
Transistor small signal models: $\beta$ model , T-model. RC-coupled audio frequency (AF) amplifiers.	6	3	3
Power amplifiers: Class-A, Push-pull operation, (Class-A, Class-B, Class C).	12	6	6
Operational amplifiers (OPAMPs) difference amplifier, OPAMP applications.	12	6	6
Inverting, non-inverting, adder, subtractor, integrator, differentiator. Feedback amplifiers (FB).	12	6	6
FB concept, general characteristics of negative FB amplifiers, input and output impedances	6	3	3
Oscillators: concept of stability and oscillations, OPAMP oscillators. Waveform shaping circuits.	18	9	9
Multivibrators (MVs): bistable MVs, monostable and astable MVs.	12	6	6

**Teaching And Learning Methodologies :**

Lectures
Tutorials
Laboratories

**Course Assessment :**

Methods of assessment	Relative weight %	Week No	Assess What
Attendance ,Lab.	5.00	10	to assess the ability of implementing simple electronic circuits and measure the different characteristics.
Final-term	40.00	15	to assess the comprehensive understanding of the scientific background of the course, to assess the ability of problem solving.
First Mid-Term Exam	25.00	6	to assess the skills of problem solving, understanding of the course topics.
Quizzes and Assignments	5.00	10	
Second Mid-Term Exam	25.00	10	to assess the skills of problem solving, understanding of the course topics.

**Course Notes :**

No course notes are required

**Recommended books :**

"Electronic Principles", 7th edition, A. Malvino.  
 "Electronic Circuit Analysis and Design", 2nd ed., Neamen D.