

SEMESTER <i>Fifth</i>	DEPARTMENT <i>Control Engineering</i>	COURSE TITLE <i>Analog Electronics III</i>
COURSE CODE <i>ET502</i>	HOURS: 3 UNITS: 3	COURSE SPECIFICATIONS <i>Theoretical Content</i>
1. Passive and Active Filters using operational amplifier: <ul style="list-style-type: none"> ➤ Description of basic concept of filters and the characteristics of ideal filters. ➤ Difference between passive and active filters. ➤ Frequency response, cut-off frequency and bandwidth of filters. ➤ Types of passive filters (RC-RL low pass filter and RC-RL high pass filter). ➤ Types of active filters. 		
2. Waveform Generator and Sinusoidal Oscillator Circuits using operational amplifier: <ul style="list-style-type: none"> ➤ Voltage comparators (Hysteresis and Schmitt triggers). ➤ Multivibrators and wave shaping. ➤ Theory of sinusoidal oscillation. ➤ Phase shift oscillator. ➤ Wien bridge oscillators and LC oscillators (Colpitts and Hartly oscillators). ➤ Crystal oscillator. ➤ Square wave generator. ➤ Triangular generator. 		
3. Phase-locked loop (PLL): <ul style="list-style-type: none"> ➤ Concept of Voltage-Controlled Oscillator (VCO). ➤ Component of PLL and its parameters. ➤ Types of PLL. ➤ Applications of PLL. 		
4. Voltage Regulators: <ul style="list-style-type: none"> ➤ Types of voltage regulators. ➤ Using transistors and operational amplifiers in series voltage regulators. ➤ Using transistors and operational amplifiers in shunt voltage regulators. ➤ Protection for voltage regulators. 		

- Types of IC voltage regulators.

5. Switched-Mode Power Supplies:

- Operation of modern switched-type power supply.
- Switching regulator data sheets.

6. Semiconductor Switches:

- Four-layer semiconductor devices
- Schottky diodes and Thyristors.
- The use Diacs and Triacs in power control circuits

References:

1. Ronald J. Tocci, *Fundamentals of Electronic Devices*, Charles E. Merrill Publishing.
2. Theodore F. Bogart, *Electronic Devices and Circuits*, Prentice-Hall.
3. Ralph J. Smith, *Circuits, Devices and Systems*, John Wiley.
4. Jacob Millman and Arvin Grabel, *Microelectronics*, McGraw Hill.
5. Micheal Jacob, *Applications and Design with Analog Integrated Circuits*, Prentice Hall.
6. أساسيات الإلكترونيات، تأليف: أي إن لورج، تعريب معن محمد شاكر.
7. Paul B. Zbar, *Basic Electronics*, McGraw-Hill Book Company.
8. Paul B. Zbar, *Industrial Electronics; A text-lab manual*, McGraw-Hill book company
9. Horwitz and Robinson, *Laboratory manual for the art of electronics*, Cambridge University Press.
10. Phillip Cutler, *Linear Electronic Circuits with Illustrative Problems*, McGraw-Hill Inc.