SEMESTER	DEPARTMENT	COURSE TITLE
Fifth	*Control Engineering*	*Analog Electronics III Lab.*
COURSE CODE	**HOURS** 3	**COURSE SPECIFICATIONS**
ET503	**UNITS** 1	*Practical Content*

1. Build and Test Passive and Active Filters using operational amplifier:

➤ Measuring and plotting the frequency response of RC-LPF and HPF

➤ Determining the cut-off frequencies.

➤ Measuring and plotting the frequency response of second-order LP and HP active filters.

➤ Determining the cut-off frequencies of the second order filters.

➤ Measuring and plotting the frequency response of band pass filter and band reject filter.

2. Waveform Generator and Sinusoidal Oscillator Circuits using operational amplifier:

➤ Building and testing phase shift oscillator.

➤ Investigation of the relationship between amplitude, frequency and circuit components of the generated sine wave.

➤ Building and testing Wein-bridge oscillator.

➤ Building and testing Colpitts oscillator.

➤ Building and testing a crystal oscillator, a square wave generator and triangular generator.

3. Phase-Locked Loop (PLL):

➤ Using PLL in voltage to frequency conversion.

➤ Using PLL in frequency to voltage conversion.

4. Voltage Regulators and Switched-Mode Power Supplies:

➤ Building and testing voltage regulator built from discrete transistors.

➤ Building and testing voltage regulator built from operational amplifier.

➤ Testing integrated circuit voltage regulator.

5. Semiconductor Switches:

➤ Testing and using a Schottky diode in a relaxation oscillator and vary its frequency of oscillation.

> ➢ Testing a typical Thyristors circuit.

> ➢ Building and testing an over voltage protection circuit that uses Thyristors.

References:
1. Ronald J. Tocci, *Fundamentals of Electronic Devices*, Charles E. Merril 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 الالكترونيات**، 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.