

SEMESTER	DEPARTMENT	COURSE TITLE
<i>Fifth</i>	<i>Control Engineering</i>	<i>Electronic Measurements Lab.</i>
COURSE CODE	HOURS 3	COURSE SPECIFICATIONS
<i>ET510</i>	UNITS 1	<i>Practical Content</i>
<p>1. Sensors and Transducers:</p> <ul style="list-style-type: none"> ➤ Build and use a bridge circuit for strain gauge. ➤ Build and use of a simple Wheatstone bridge circuit with a differential amplifier for a resistance thermometer. ➤ Build and use of NTC thermistors temperature sensing circuit with operational amplifier. 		
<p>2. Digital Voltmeters DVM and Digital Multimeters:</p> <ul style="list-style-type: none"> ➤ Build and use of a simple DVM. ➤ Build and test Current-to-Voltage converter circuit. ➤ Build and test an ordinary attenuator. 		
<p>3. Electronic Counters and Frequency and Time Interval Analyzers:</p> <ul style="list-style-type: none"> ➤ Get familiar with Frequency counters operation. ➤ Frequency, time interval, and phase measurements. ➤ Sample rate measurements. 		
<p>4. Analysis Instruments:</p> <ul style="list-style-type: none"> ➤ Use of Harmonic analyzer to measure (Amplitude distortion, Frequency distortion, Phase distortion). ➤ Use of Spectrum analyzer to measure frequency and amplitude of carrier signal and sideband signals and bandwidth of modulated signal. ➤ Use of Spectrum analyzer to measure noise level. ➤ Measurement of RF power spectrum with Spectrum Analyzer. 		
<p>5. Optical Time Domain Reflectometers:</p> <ul style="list-style-type: none"> ➤ Use of OTDR to measure fiber cable length. ➤ Use of OTDR to detect and locate cable breaks and splicing connectors. ➤ Use of OTDR to measure total cable loss. 		

References:

1. A. D. Halftrack and W. D. Cooper, *Modern Electronic Instrumentation and Measurements Techniques*, Prentice-Hall.
2. John G. Webster, *The Measurement, Instrumentation and Sensors Handbook*, Springer Revlag Berlin and Heidelberg.
3. Larry D. Jones, A. Foster Chin, *Electronic Instruments and Measurements*, Prentice-Hall, Inc.
4. Clyde F. Coombs, Jr. *Electronic Instrument Handbook*, Forth Edition, McGraw-Hill, Inc.