

SEMESTER <i>Fifth</i>	DEPARTMENT <i>Telecommunications Engineering</i>	COURSE TITLE <i>Electronic Measurements</i>
COURSE CODE <i>ET509</i>	HOURS 3 UNITS 3	COURSE SPECIFICATIONS <i>Theoretical Content</i>
1. Sensors and Transducers: <ul style="list-style-type: none"> ➤ Classification of sensors and transducers. ➤ Selection of sensors and transducers. ➤ Basic types of sensors and transducers (resistive position transducer, strain gauge transducer, inductive transducer, capacitive transducer, thermo-couple transducer, piezoelectric transducers, thermistors, photo-electric transducers, hall-effect transducers). 		
2. Digital Voltmeters DVM: <ul style="list-style-type: none"> ➤ Advantages of digital measuring instruments. ➤ Basic Digital Voltmeter Architectures (A/D Converters, Decade Counting Units, and Display Unit) and Operation. ➤ Types of Digital Voltmeters (Single-slope, Dual-slope, Voltage-to-Frequency Converters, and Successive-Approximation). 		
3. Digital Multimeters: <ul style="list-style-type: none"> ➤ Basic Digital Multimeter Architectures and Operation. ➤ Ordinary and Compensated Attenuators. ➤ Current-to-Voltage Converter. ➤ Current rectifiers. 		
4. Electronic Counters and Frequency and Time Interval Analyzers: <ul style="list-style-type: none"> ➤ Frequency counters basic architectures. ➤ Universal counter basic architecture and specifications. ➤ CW and pulse microwave counters and their basic architectures. ➤ Frequency and time-interval analyzer architecture and specifications. 		

5. Analysis Instruments:

- Wave analyzer operations and applications.
- Harmonic analyzer operations and applications.
- Spectrum analyzer operations and applications.

6. Phase Noise Instrument:

- The need to measure Phase Noise.
- Definition and representations of phase noise.
- Measurement of phase noise.

7. Optical Time Domain Reflectometers:

- Basic block diagram of OTDR.
- Operation of OTDR.
- The backscattering impulse response.
- Rayleigh scattering.
- OTDR applications and specifications.

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.