

Lecture Plan
Measurement and Instrumentation (EC-501)

Units	Lecture	Topics Covered
Unit 1		Electronic Instrument Systems
	Lecture 1	Standards of measurement of mass, length, volume, Time and Frequency
	Lecture 2	Electrical standards, Standards of Temperature and Luminous Intensity
	Lecture 3	IEEE standards, Engineering Analysis of Instrument Systems
	Lecture 4	Experimental Errors, Minimization of Errors, Frequency Response and Calibration of Instrument Systems
		Transducers
	Lecture 5	Classification: Displacement, Resistive, Capacitive
	Lecture 6	Inductive, Piezo Electric, Piezo Resistive, Photo electric
	Lecture 7	Crystal Oscillators, Semiconductors Transducers
	Lecture 8	Numerical
Unit 2		Bridge Measurements
	Lecture 1	Wheatstone Bridge, Kelvin Bridge, Guarded Wheatstone Bridge
	Lecture 2	AC Bridges: Maxwell, Hay, Schering, Wien Bridges
	Lecture 3	Numericals
		High Frequency Measurements
	Lecture 4	Problems in High Frequency Measurements
	Lecture 5	RF Power and Voltage Measurement, RF Impedance
	Lecture 6	Q-Meter, Digital Voltmeter, Time, Frequency and Phase Measurements
	Lecture 7	Measurement on CRO, Group Delay Measurement, DSO
	Lecture 8	Numericals
Unit 3		Measurement of Non- Electrical Quantities
	Lecture 1	Temperature: Resistance Thermometer,
	Lecture 2	Thermocouple, IC Sensors
	Lecture 3	Radiation Method (pyrometer)
	Lecture 4	Measurement of: Pressure,
	Lecture 5	Fluid Flow, Force,
	Lecture 6	Torque, Displacement,
	Lecture 7	Velocity and Acceleration
Unit 4		Measurements contd....
	Lecture 1	Measurement of Amplifier and Receiver Characteristics,
	Lecture 2	Data Distribution and Bus Structure,
	Lecture 3	IEEE488 Interface, PC based acquisition system,
	Lecture 4	Data Transmission, D to A and A to D convertors,
	Lecture 5	Pulse Modulation Techniques.
	Lecture 6	Telemetry,
	Lecture 7	Tracking
	Lecture 8	and Command
Unit 5		Signal Generation
	Lecture 1	Frequency Synthesized Signal Generator, Frequency Divider Generator

	Lecture 2	Signal Generation Modulation, Sweep Frequency Generator
	Lecture 3	Pulse and Square wave generators, Function generator
	Lecture 4	Display Devices, Signal Analyzer,
	Lecture 5	Wave analyzer, Harmonic Distortion analyzer,
	Lecture 6	Spectrum Analyzer
	Lecture 7	Microprocessor Based Instrumentation,
	Lecture 8	Computer Controlled Test System
	Lecture 9	Fiber Optic Measurements.

References:

1. **Helfrick and Cooper**
2. **E. O. Doebelin**
3. **A.K. Sahni**

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