



ELECTRICAL MEASUREMENT AND ELECTRONIC INSTRUMENTS

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PRE-REQUISITES : Basic Principles of Electrical Engineering (Circuit Theory), Basic Digital and Analog Electronics

INTENDED AUDIENCE : Mainly Electrical/ Instrumentation Engineering; also interested students from Electronics, Physics and similar disciplines

INDUSTRIES APPLICABLE TO : Must for Power generation industry, Power distribution industry, Electronics industry; Also highly required for Automotive industry, Rail industry, Aerospace industry, Telecommunications industry, Oil and gas industry, Construction industry, Defense industry, Marine industry, Materials and metals industry

COURSE OUTLINE :

It is a core course for all UG Electrical Engineering students. The content of this course is also aligned to the syllabus for the GATE EE exam. The course has two halves:

(1) Electrical Measurements

Working principle and Dynamics of different Electro-Mechanical Instruments, Ammeter, Voltmeter, Ohmmeter, Wattmeter, Energy meter, Measurement of resistance and impedances, Bridges and potentiometers, Instrument transformers.

(2) Electronic Instruments

Differential Amplifier, Op-Amp Circuits, Analog DC and AC instruments, ADC and DAC, Digital instruments, Function Generator, Oscilloscope

ABOUT INSTRUCTOR :

Prof. Avishek Chatterjee received the degree of B.E.E from Jadavpur University, Kolkata in 2009 followed by the degree of M.E. and PhD. From Indian Institute of Science in 2011 and 2016 respectively. He teaches this subject in IIT Kharagpur.

COURSE PLAN :

Week 1: Module A1 : Measurement Error, Accuracy and Instrument grades , Module A2: Electromechanical instruments

Week 2: Module A2: Electromechanical instruments (contd.) , Module A3 : Electromechanical ammeters, voltmeters and ohmmeters

Week 3: Module A4 : Electromechanical wattmeter and energy meter

Week 4: Module A5 : Resistance Measurement , Module A6 : Impedance Measurement: AC Bridges

Week 5: Module A6 : Impedance Measurement: AC Bridges (contd.) , Module A7 : Potentiometers: DC and AC ,

Week 6: Module A8 : Instrument transformers: CT & PT , Module A9 :Magnetic Measurement

Week 7: Module B1 : Analog Instrumentation Basics

Week 8: Module B1 : Analog Instrumentation Basics(contd.) , Module B2 : Analog Instrumentation

Week 9: Module B3 : Digital Instrumentation Basics

Week 10: Module B4 : Digital Instrumentation

Week 11: Module B5 : Signal and Function Generators

Week 12: Module B6 : Oscilloscope and Electronic probes