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: Measurement Error, Accuracy and Instrument grades , Electromechanical Instruments

Week 2: Electromechanical instruments, (contd) Electromechanical Ammeters,oltmeters and Ohmmeters

Week 3: Electromechanical Wattmeter and Energy Meter

Week 4: Resistance Measurement, Impedance Measurement: AC Bridges

Week 5: Potentiometers: DC and AC

Week 6: Instrument Transformers: CT & PT, Magnetic Measurement

Week 7: Analog Instrumentation Basics

Week 8: Analog Instrumentation

Week 9: Digital Instrumentation Basics

Week 10: Digital Instrumentation

Week 11: Signal and Function Generators

Week 12: Oscilloscope and Electronic probes