

1.	Title of the course	Principles of Measurement
2.	Course number	EE306M
3.	Structure of credits	3-0-2-4
4.	Offered to	UG
5.	New course/modification to	Modification To EE3204/8
6.	To be offered by	Department of Electrical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	Course Objective(s): To introduce the basic principles of conducting electrical and electronic measurements. The laboratory part of the course provides a hands-on experience of commonly used electrical and electronic measuring instruments (e.g., oscilloscopes, digital multimeters, etc).	
10.	Course Content: Units, significant digits; Errors in measurements: systematic and random errors, propagation of errors; Analog indicating instruments: permanent magnet moving coil meter, moving iron meter, electro-dynamometer, wattmeter and energy meter; Digital methods of measurement: counter-timer, analog-to-digital converters, digital multimeter, data-acquisition systems; Graphical methods of measurement: oscilloscopes; Null balance method: dc and ac potentiometers, dc and ac bridges; Voltage and current scaling: current transformers and voltage transformers; The laboratory experiments are based on 1. Statistics and random variables 2. Measurement of opamp parameters 3. B-H curve for transformers 4. Power measurement 5. Bridges 6. Analog-to-Digital converters 7. Application of the above mentioned concepts towards measurement of sensor parameters.	
11.	Textbook(s): 1. Bell D A, <i>Electronic instrumentation and measurements</i> , Oxford (2013). 2. Helfrick A D and Cooper W D, <i>Modern electronic instrumentation and measurement techniques</i> , Pearson (2015).	
12.	Reference(s): 1. Frank E, <i>Electrical measurement analysis</i> , Mc-Graw Hill (1959). 2. Golding E W and Widdis F C, <i>Electrical measurements and measuring instruments</i> , Wheeler Publishing House (2011).	