

Programme: M. Sc. (Physics)

Course Code: PHGO-120

Title of the Course: Methods of Experimental Physics

Number of Credits: 4

Effective from AY: 2021-22

<u>Prerequisites for the course:</u>	Nil	
<u>Objective:</u>	This course seeks to develop understanding of principles of measurement of various fundamental quantities in a Physics laboratory.	
<u>Content:</u>	1. Measurement of temperature Thermocouple, diode and semiconductor sensors, RTD, pyrometer, Langmuir probes,	8 hours
	2. Measurement of resistance Two probe measurement and four probe measurement using constant current source and constant voltage source, Lock-in amp, discharge of capacitance	8 hours
	3. Measurement of capacitance RC circuit, DC bridges, AC Bridges	8 hours
	4. Measurement of radiation GM counter, ionization chambers, scintillation detector, solid state detectors, CCD detectors	10 hours
	5. Measurement of magnetic flux Force methods, induction methods (including SQUID), Hall probe, indirect methods (MOKE)	10 hours
	6. Measurement of frequency Resonance methods	8 hours
	7. Estimation of errors in measurement. Precision and accuracy, estimation of errors, propagation of errors, general formula, least square fitting, non-linear least square	8 hours
<u>Pedagogy:</u>	Lectures and Laboratory Experiments.	
<u>References/Readings</u>	1. P. R. Bevington and D. K. Robinson, Data Reduction and Error Analysis for the Physical Sciences, McGraw Hill (Indian Edition) 2015. 2. R. Srinivasan, K. R. Priolkar and T. G. Ramesh, A Manual on Experiments in Physics, Indian Academy of Sciences, 2018.	
<u>Learning Outcomes</u>	1. Understand the advantages and disadvantages of using a technique or probe for making scientific measurements. 2. Demonstrate the ability to use selected pieces of measuring devices. 3. Estimate and translate errors and report quantities up to last significant digit	