1.	Title of the course	Advanced Physics Laboratory
2.	Course number	PH603P
3.	Structure of credits	0-0-6-4
4.	Offered to	PG
5.	New course/modification to	Modification To PH6191/10
6.	To be offered by	Department of Physics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To enhance experimental skills by training students on a few important and advanced experimental tools and techniques in different branches of physics.To help students acquire knowledge in data analysis techniques, instrumentation, instrumental interfacing for automation, control, and data acquisition and gain insights into designing of experiments. To enable students augment their computational programming skills through learning advanced numerical recipes and simulation techniques in diverse branches of Physics.	
10.	**Course Content:** Material synthesis and characterization techniques such as x-ray diffraction, microscopy; Optical spectroscopy; Plasma Physics; Study of physical properties at ambient and extreme conditions such as at low temperatures and high magnetic fields; Vacuum technology; Cryogenics; Instrumentation; Interfacing; Advanced computational techniques: Classical and Quantum simulation methods such as Monte Carlo, Density Matrix Renormalization Group, Density Functional Theory and Hartree Fock method; Programming with Gaussian, Labview, Matlab, Mathematica and Python.	
11.	**Textbook(s):** 1. Melissinos C A and Napolitano J, *Experiments in Modern Physics*, Elsevier (2003). 2. Moore H J, Davis C C and Coplan A M, *Building Scientific Apparatus*, Westview Press (2002).	
12.	**Reference(s):** 1. Bevington P and Robinson K D, *Data Reduction and Error Analysis for the Physical Sciences*, McGraw-Hill Education (2015). 2. Dunlap A R, *Experimental Physics: Modern Methods*, Oxford University Press (1997). 3. Pergament I M, *Methods of Experimental Physics*, CRC Press (2014). 4. Thijssen J M, *Computational Physics*, Cambridge University Press (2013).	