

1.	Title of the course	Advanced Engineering Physics Laboratory
2.	Course number	PH302P
3.	Structure of credits (L-T-P-C)	0-0-6-4
4.	New course/modification to	New
5.	To be offered by	Physics
6.	Proposed by	Reetesh Kumar Gangwar
7.	Prerequisite	None
8.	Course Objective(s): To demonstrate advanced research-level instruments. To enhance experimental skills by illustrating instrumentation, instrumental interfacing for automation, control and data acquisition. To gain insights into designing experiments. To explain modeling and simulation techniques used in physics and allied engineering.	
9.	Course Content: Design and development of a grating based spectrometer and perform the emission spectroscopy measurement on a standard lamp source; Assemble low pressure reactor and study the discharge characteristics; Measurement of pressure and pumping rate; Setup the saturation absorption spectroscopy and measure the transition frequency in calcium vapour cell; Design the interferometer and determine wavelength of the source; Material synthesis and characterization techniques: x-ray diffraction, microscopy; Study of physical properties at ambient and extreme conditions such as at low temperatures and high magnetic fields; Instrumentation; 3D printing; Interfacing; Modelling and simulation methods used in applied physics.	
10.	Textbook(s): 1. Melissinos C A and Napolitano J, Experiments in Modern Physics, 2nd Edition, Academic Press (2003). 2. Moore H J, Davis C C and Coplan A M, Building Scientific Apparatus, 4th Edition, Cambridge University Press (2002).	
11.	Reference(s): 1. Bevington P and Robinson K D, Data Reduction and Error Analysis for the Physical Sciences, 3rd Edition, McGraw-Hill Education (2015). 2. Mahamuni S, Sidhaye D and Kulkarni S, Foundations of Experimental Physics, CRC Press (2020).	