

Approved in 37th BoA Meeting (29-10-2020)

Course Name : Engineering of Instrumentation
 Course Number : EP401P
 Credits : 1-0-5-4
 Prerequisites : PH301 or PH513 and PH501 or PH523.
 Intended for : B.Tech. in Engineering Physics
 Distribution : Core course for B.Tech. in Engineering Physics.

Preamble: This course is aimed at giving instrumentation exposure to students by lectures on various techniques along with demonstration and hands on practices for small scale instruments with central focus on the working physics.

Modules:

1. Introduction to data Acquisition systems, Labview/open source (such as Python) programming (Interfacing and programming), Signal processing and Error analysis.
2. Automatic control (PID control, Feed forward control, Time delay and inverse response systems, Sequence control).
3. Cryogenics Instrumentation (Low temperature, Liquefaction of gases, Close Cycle Refrigerator, Temperature sensor). Vacuum pumps (Rotary, Dry scroll, Root pumps) with focus on role of valves, gauges etc.
4. Introduction to design and working of instruments (Electron microscope, Scanning Tunneling Microscopy, Atomic force microscope and Superconducting magnets)

Textbooks:

1. Transmission Electron Microscopy, by C. Barry Carter and David B. Williams, Springer, New York (2016).
2. Experimental Techniques in Condensed Matter Physics at Low Temperatures, by Robert C. Richardson and N. Smith ; CRC Press (2018).

References: As advised by the course instructors.

1. Similarity Content Declaration with Existing Courses

S.N.	Course Code	Similarity Content	Approx. % of Content
1			

2. Justification for new course proposal if cumulative similarity content is > 30%:

NA.

