

Course Title	Sensors and Measurements	Course No			
Specialization	Electronics Engineering	Structure (IPC)	3	0	3
Offered for	EDM/EVD/EDS/MDM/MSM/MFD/MPD	Status	Elective		
Pre-requisite	Thermodynamics, Heat Transfer, Basic Electronics/Electrical Engineering	To take effect from			
Objectives	The first objective of this course is to provide the fundamentals of sensors, their design and use in measurement practice. A second objective is to provide a good foundation in the design of experiments and interpretation of data.				
Course Outcomes	At the end of the course the student will be able to choose (a) the right type of sensor to perform measurements to suit a specific task, (b) perform a set of experiments to bring out the general features of the problem under study, (c) report the findings in a proper manner to his peers.				
Contents of the course	<ol style="list-style-type: none"> 1. Introduction to measurements for scientific and engineering applications – need and goal – broad category of methods for measuring field and derived quantities (2) 2. Principles of measurement – parameter estimation – regression analysis – correlations – error estimation and data presentation – analysis of data - Introduction to design of experiments (6) 3. Sensors, their characterization, dynamic behavior, calibration (4) 4. Measurement of field quantities – thermometry – heat flux measurement – measurement of force, pressure, flow rate, velocity, humidity, noise, vibration (12) 5. Measurement of derived quantities – torque, power, thermo-physical properties – radiation and surface properties (10) 6. Analytical methods and pollution monitoring – mass spectrometry - chromatography – spectroscopy. (4) 7. Signal conditioning and manipulation, Data Transmission and Instrument Connectivity (4) 				
Text Books	<ol style="list-style-type: none"> 1. Ernest O Doebelin, Measurement Systems; Application and Design, 5th Edition, McGraw Hill 2004. 2. S. P. Venkateshan, Mechanical Measurements, 2nd Edition, Ane Books Pvt. Ltd., 2013. 				
References	<ol style="list-style-type: none"> 1. S Soloman, Sensors Handbook, McGraw-Hill, 2nd Edition, 2010. 2. John G Webster, Chief Editor, The Measurement, Instrumentation and Sensors Handbook, CRC Press and IEEE Press, 1999. 				