

SYLLABUS :-

Introduction Different Phases of automation. Importance of sensor/smart sensor in automation. Features of Advanced sensing techniques. Sensor classifications according to the energy domains. Introduction of advanced sensing materials. Properties (physical, electrical, chemical, biological) of materials which makes it suitable for sensing in different domain. Design and modeling Design and modeling issue in advanced sensing technique Introduction of different mathematical tools used in sensor design Study of analytical design from given specification, conformal mapping, Optimization techniques used in sensor design. Numerical design such as FEM, FDM, etc. Study of Tomography and Concept of Feed back in sensing Fabrication and packaging Introduction to MEMS sensor. Comparison between MEMS and Macro sensor. Fabrication and packaging issue in sensor design Thick film and thin film technique Physical sensors Hall Effect sensors, Eddy current sensors, magneto resistive and magneto strictive detectors, Accelerometers: Capacitive, Piezoelectric, Piezoresistive, Thermal Humidity and moisture sensor Proximity detectors using polarized light, Semiconductor gas sensor Semiconductor gas sensor Fluidic and Micro-fluidic sensors Chemical sensor Chemical sensor characteristics, specific difficulties related to chemical sensor, Classification of Chemical sensing mechanism Study of chemical sensor based on the principle direct sensing techniques such as Metal oxide chemical sensor, electrochemical sensors, potentiometric sensors, conductive sensors, amperometric sensors, enhanced catalytic gas sensors, enzyme sensors Study of chemical sensors in indirect mode such as thermal sensor, optical chemical sensor, biochemical sensor, enzyme sensor Sensor array Introduction to the concept of Lab on chip/sensor platform technology The role of PCA, LDA, Neural network in designing sensor array Study of temperature cycle mode of sensing to obtain virtual sensor array Case study of a gas sensing platform, liquid sensing