

Subject Code: 01ME0742
Subject Name: Sensorics
B.Tech. IV Year – (Sem-7) Mechanical Engineering
Type of course: Program Elective

Rationale: The course is prepared to provide the detail knowledge of Sensors used in Machine and proces Automation

Teaching and Examination Scheme:

TeachingScheme(Hours)			Credits	Evaluation Scheme					Total Marks
Theory	Tutorial	Practical		TheoryMarks			PracticalMarks		
				ESE (E)	IA	CSE	Viva (V)	Term Work (TW)	
4	0	2	5	50	30	20	25	25	150

COURSE OUTCOME

Students will be able to

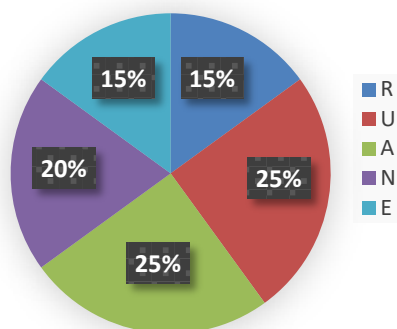
1. Understand working principal and construction of different types of sensors
2. Apply the knowledge of different sensors to prepare Automated Machines and processes

Sr no	Contents	Total hours	Weightage
1	Basic need of a sensors, Classification of sensors, Static and Dynamic characteristics of sensors, Types of Sensors: Displacement, Linear and Rotary displacement,Potentiometer, Capacitive and Inductive type displacement sensor, position sensors, Optical encoder, Photoelectric sensor, Hall Effect Sensor		
2	Eddy current proximity sensor- Inductive Proximity sensor- Capacitive Proximity sensor -Pneumatic Proximity sensors: Proximity Switches: Contact type and Noncontact type, Strain Gauge , Piezoelectric Sensor, Tactile sensor,Diaphragm Pressure Sensor, Capsule Pressure sensors, Bellows Pressure Sensor,Bourdon tube pressure sensor.		

	MEASUREMENT OF VELOCITY, FLOW AND LEVEL : Tachogenerator - Pyroelectric sensors - Ultrasonic sensor – Resistive sensor- Pitot tube – Orificeplate - flow nozzle- Venturi tubes – Rotameter- Electromagnetic flow meter. Float level sensor- Pressure level sensor- Variable capacitance sensor. Non conventional Measurement Sensors		
	MICRO SENSORS AND ACTUATORS : Micro Sensors: Principle Force and pressure micro sensors, position and speed micro sensors, acceleration micro sensors, chemical sensors, biosensors, temperature micro sensors and flow micro sensors. Micro Actuators: Actuation principle, shape memory effects-one way, two way and pseudo elasticity. Types of micro actuators- Electrostatic, Magnetic, Fluidic, Inverse piezo effect, other principles		

Distribution of Theory Marks

Remembrance	Understanding	Application	Analyze	Evaluate
15	25	25	20	15



Reference Books

1. Sensors and Transducers by Ian R. Sinclair Newnes
2. Master book on Sensors by P. Ripka and A. Tipek
3. Hand book of Modern Sensors by Jacob Fraden Springer
4. Understanding Smart Sensors by Randy Frank

List of Open Source Software/learning website

<http://nptel.ac.in/courses>