Course Type	Course Code	Name of Course	L	T	P	Credit
OE	PHO300	SENSOR AND TRANSDUCERS	3	0	0	9

Course Objective

The main objective of the course is to give basic understanding about the various sensors and transducers. The details of fundamental principle and operation of various types of sensors and transducers will be given with emphasis on their applications in various fields.

Learning Outcomes

Upon successful completion of this course, students will:

- have a broad understanding of various types of sensors and transducers.
- have a thorough knowledge of the fundamental principle and operation of various types of sensors and transducers.
- be able to apply various types of sensors and transducers in different applications/fields.
- be able to calculate various types of parameter (like operational conditions, sensitivity, selectivity etc.) for different types of sensors and transducers.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Basics of sensors and transducers**: Principle, Classifications, Parameters: Characteristics, Environmental parameters.	4	This topic will give the idea about the various types of sensors and transduces along with related characteristics and parameters.
2	***Sensors:*** **Mechanical and Electromechanical sensors:** Resistive potentiometer, Inductive sensor, Capacitive sensor, Stress sensors, Ultrasonic sensors.	7	This unit will help student to get the basic principle of the different types of Mechanical and Electromechanical sensors.
3	**Thermal sensors:** Gas thermometric, Thermal expansion type thermometric, Resistance change type thermometric, Thermo-emf sensor.	5	This unit will help student to understand the fundamental principle of the different types of thermal sensors along with its properties.
4	**Magnetic sensors:** Magnetoresistive, Hall-Effect, Inductance, Eddy-current etc.	4	This section will help student to know the principle of operation of different types of Magnetic sensors along with its properties and applications.
5	**Radiation sensors:** Photodetectors, Photoelectric, Ionization Thermal radiation sensors, X-ray and Nuclear radiation sensors etc.	4	This topic will help student to get the basic principle of the different types of Radiation sensors.
6	**Electroanalytical sensors:** Electrochemical cell; Polarization; Electrodes Cell potential, Liquid junction etc.	4	In this topic, students will learn about the Electroanalytical sensors. They will also get familiar with various Electroanalytical parameters.
7	***Transducers:*** **Mechanical transducers:** Temperature, Pressure, Force, Torque, Flow measurements; Displacement-to-Pressure transducer, Seismic displacement transducer.	6	This part will mainly focus on various transduction principle. The details of different types of mechanical transducers and their operational principle will be discussed in detail.
8	**Active electrical transducers:** Piezoelectric, Electromechanical, Electrochemical transducers.	4	This topic will help student to get the basic principle of the different types of Active electrical transducers.
9	**Feedback transducer systems:** Amplifiers, oscillators, automatic control system	4	This part will summarize various types of Feedback transducer systems.
	Total	**42**	

Textbooks:

1. Sensors and Transducers by D. Patranabis; PHI, Eastern Economy Edition 2004.
2. Transducers and Instrumentation (2 Ed) by D. V. S. Murty, PHI Learning (2008)

Reference Books:

1. Sensors and Transducers by Ian Sinclair, Newnes, 3rd Edition 2001.
2. Sensors and Transducers by MJ Usher, Scholium International 1985.