

COURSE CODE: 1153EE113	COURSE TITLE: TRANSDUCERS AND SENSORS	L	T	P	C
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COURSE CATEGORY: Allied Elective / University Elective

PREAMBLE

To enable the students to select and design suitable instruments to meet the requirements of industrial; application and various transducers, sensors used for the measurements of various physical quantities.

PREREQUISITES:

Basic Electrical Engineering

COURSE EDUCATIONAL OBJECTIVES:

To impart knowledge on

- To understand the structural and functional principles of sensors and transducers used for various physical and nonelectric quantities.
- To explain the principles of operation of the sensor parameters
- To understand the knowledge about the implementation of sensors and transducers into a control system structure.

COURSE OUTCOMES:

Upon the completion of the course students will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's taxonomy)
CO1	Classify and describe various transducers which are used for measuring various parameter like displacement, temperature etc.	K2
CO2	Understand the static and dynamics characteristics of transducers	K2
CO3	Identify the type of transducers used for various application	K2
CO4	Understand the virtual instrumentation for various data acquisition	K2
CO5	Understand the types sensor used for various applications	K2

CORRELATION OF COs AND POS

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	H	M	H	H	L						L	
CO2	M	L	H	M	L						L	
CO3	H	L	H	M	L						M	
CO4	H	L	H	M	L						M	
CO5	H	H	H	M	M						H	

COURSE CONTENTS		
UNIT I	INTRODUCTION	9
Basic method of measurement, generalized scheme for measurement systems, units and standards, errors, classification of errors, error analysis, statistical methods, sensor, transducer , classification of transducers, basic requirement of transducers.		
UNIT II	CHARACTERISTICS OF TRANSDUCERS	9
Static characteristics, dynamic characteristics, mathematical model of transducer, zero, first order and second order transducers – response to step, ramp and sinusoidal inputs.		
UNIT III	RESISTIVE, INDUCTIVE AND CAPACITANCE TRANSDUCERS	9
Potentiometer, Strain gauge, LVDT, variable reluctance transducers, Proximity transducers, capacitive transducer, Capacitor microphone, capacitive thickness Transducers, capacitive strain transducers, hall effect transducer, fiber optic transducer and its application.		
UNIT IV	DATA ACQUISITION	9
Types of transducer, signals, signal conditioning, DAQ hardware, analog inputs and outputs, DAQ software architecture, selection and configuration data acquisition device, components of computer based measurement system		
UNIT V	SENSORS	9
Introduction to sensors, types of sensor, smart sensors, fiber optic sensors, MEMS, nano sensors, Ultrasonic Sensors, Thin Film Sensors, Liquid Level Sensors, typical application of sensors		
TOTAL: 45 PERIODS		
TEXTBOOKS:		
<ol style="list-style-type: none"> 1. Sawhney. A.K, "A Course in Electrical and Electronics Measurements and Instrumentation", 18th Edition, Dhanpat Rai & Company Private Limited,2007. 2. Renganathan. S,"Transducer Engineering", Allied Publishers, Chennai, 2003. 3. Murthy.D.V.S, "Transducers and Instrumentation", Prentice Hall of India,2001 		
REFERENCE BOOKS:		
<ol style="list-style-type: none"> 1. Doebelin. E.A, "<i>Measurement Systems – Applications and Design</i>", Tata McGraw Hill, New York, 2000. 2. Patranabis. D, "<i>Sensors and Transducers</i>", Prentice Hall of India, 1999. 3. John. P, Bentley, "<i>Principles of Measurement Systems</i>", III Edition, Pearson Education, 2000. 4. Doebelin. E.A, "<i>Measurement Systems – Applications and Design</i>", Tata McGraw Hill, New York, 2000. 		