

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications (Open Elective - III)

SYLLABUS FOR B.E. V - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U200E510EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. The student will come to know the various stimuli that are to be measured in real life instrumentation. 2. He will be able to select the right process or phenomena on which the sensor should depend on 3. He will be aware of the various sensors available for measurement and control applications.	On completion of the course, students will be able to 1. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields. 2. Visualize the sensors and the measuring systems when they have to work in areas of interdisciplinary nature and also think of sensors and sensors systems when for a new situation they encounter in their career 3. Identify and select the right process or phenomena on which the sensor should depend on. 4. Know various stimuli that are to be measured in real life instrumentation.

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1					1							2	
CO2	2	2		2			1							2	
CO3	1	1	1	2			1							2	
CO4	1	2	2											2	

UNIT - I

Introduction to sensors and transducers .Need for sensors in the modern world. Different fields of sensors based on the stimuli - various schematics for active and passive sensors. Static and dynamic characteristics of sensors - zero, I and II order sensors – Response to impulse, step, ramp and sinusoidal inputs. Environmental factors and reliability of sensors.

UNIT – II

Sensors for mechanical systems or mechanical sensors - Displacement - acceleration and force - flow of fluids - level indicators - pressure in fluids - stress in solids. Typical sensors - wire and film strain gauges, anemometers, piezo electric and magnetostrictive accelerometers, potentiometric sensors, LVDT.

UNIT – III

Thermal sensors – temperature – temperature difference – heat quantity. Thermometers for different situation – thermocouples thermistors – color pyrometry.

Optical sensors: light intensity – wavelength and color – light dependent resistors, photodiode, photo transistor, CCD, CMOS sensors.

Radiation detectors: radiation intensity, particle counter – Gieger Muller counter (gas based), Hallide radiation detectors.

UNIT – IV

Magnetic sensors: magnetic field, magnetic flux density – magneto resistors, Hall sensors, super conduction squids.

Acoustic or sonic sensors: Intensity of sound, frequency of sound in various media, various forms of microphones, piezo electric sensors.

UNIT – V

Electrical sensors: conventional volt and ammeters, high current sensors, (current transformers), high voltage sensors, High power sensors.

High frequency sensors like microwave frequency sensors, wavelength measuring sensors. MEMs and MEM based sensors.

Learning Resources :

- Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.
- Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.
- Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.
- Jacob Fraden, "Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.
- Manabendra Bhuyan, "Intelligent Instrumentation Principles and Applications", CRC Press.
- Randy Frank, "Understanding Smart Sensors", Second edition, Artech House.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Tests	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>

Duration of Internal Tests: 90 Minutes

