SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Bachelor of Technology

B. Tech. Year II[nd] Semester – 4

Subject Name: Sensors **Subject Code: BTIC18113**

Type of course: Trans-disciplinary

Prerequisite (if any) : Desire to know the working of sensors, Fundamental laws of physics

List of Courses where this course will be prerequisite : The course where knowledge related with is required.

Rationale: (should also include Description of the relevance of this course in the Program)

Sensors are part of our life. When human needs to quantify any physical parameter, it is required to sense that parameter first and convert into numerical values. We are using sensors in our day to day life like we breath. This subject will help to understand the various sensors, their classification, working and applications of it in various field.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	
2	0	0	0	60	25	15			100

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests CA2: Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems TEE: Term End Examination TEP: Term End Practical Exam (Performance and viva on practical skills learned in course) CA3: Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

BSC: basic science course /ESC: Engineering Science Course /HSM: Humanities and management /PCC: Professional Core course /PEC: professional Elective course /OEC: Open Elective course/ MD: mandatory non-credit course

Content:

Sr. No.	Content	Total Hrs	Module Weightage
1	General concepts and terminology of measurement systems, transducer classification, general input-output configuration, static and dynamic characteristics of a measurement system Application examples & problem solving	**6**	**20 %**
2	Variable Resistance, Inductive and Capacitive Transducers: Potentiometers, metal and semiconductor strain gauges strain gauge applications: Load and torque measurement. Inductive Transducers- Transformer type, eddy current transducers, proximity detectors Capacitive Transducers - various configuration Applications in home appliances, buildings, automobiles, medical, etc. Problem solving sessions	**13**	**44 %**
3	Piezoelectric transducers, photoelectric transducers, Hall effect sensors, Magneto-strictive transducers	**4**	**13 %**
4	Digital displacement sensors, Fibre optic sensor, Semiconductor sensor and Smart sensors.	**4**	**13 %**
5	Bio-Chemical Sensors	**3**	**10 %**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**10**	**10**	

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Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	*Transducers and Instrumentation*	Murthy D. V. S	Prentice Hall, ISBN 978-120335691	2011	*2nd*
2	*Instrument Transducers - An Introduction to their Performance and Design*	Neubert H.K.P	Oxford University Press ISBN 978-0195629972	1999	2nd
3	*Sensors and Transducers*	Patranabis D	Prentice Hall ISBN 978-120321984	2003	2nd

Course Outcomes:

Sr. No.	CO statement When completed this course, students will be able to:	Marks % weightage
CO-1	explain the principles of sensors and transducers with their technical characteristics and constraints	50

CO-2	estimate the performance of sensors in different applications and conditions	30
CO-3	design, implement and critically evaluate methods for sensor from pre-processing to classification, field data collection and accuracy assessment	20

Mapping with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	1			1	2	3	1		2	3	3	3	1	1
CO-2	3	1	1	1	1					2	3	3	2	1	1
CO-3	2	2	2	1	1	1	1	1	1	2	2	2	3	1	1
Rationale*															

Rationale* : The CO-PO-PSO mapping suggest that the students who opt this course will understand various sensors used in different equipment used in our day-to-day life.

List of Open learning website:

http://sl-coep.vlabs.ac.in/

List of Open Source Software: Nil

FOR LAB / PRACTICE SESSIONS:

List of Experiments / exercise:

.1. Characteristics of (Resistive and Thermo emf) temperature sensor

2. Characteristics of Piezoelectric measurement system

3. Measurement of displacement using LVDT

4. . Measurement of strain using strain gauges

5. Measurement using proximity sensors

6. Characteristics of capacitive measurement systems

7. Design of Opto-coupler using photoelectric transducers

Major Equipment Needed:

Sensor kits for various parameters, Testing instruments