SRM UNIVERSITY
Faculty of Engineering and Technology

DEPARTMENT OF EIE

Course Code : EI0303 Industrial Instrumentation
Course Title : Industrial Instrumentation
Year& Semester : III & 5th semester
Course time : 45 hours
Location :Tech Park

Faculty Details:

Name of the staff	Section	Staff Room	Office Hours	Mail ID
K.Elavarasi	EIE A	Tech park	8.45 am- 4 pm	elavarasi.k@ktr.srmuniv.ac.in
P.Anitha Saraswathy	EIE B	Tech park	8.45 am- 4pm	anitha.p@ktr.srmuniv.ac.in
R.Sasikala	EIE C	Tech park	8.45 am- 4pm	sasikala.r@ktr.srmuniv.ac.in
S.Indirani	EIE D	Tech park	8.45 am- 4 pm	indirani.s@ktr.srmuniv.ac.in

Required Text Books:

1. D.Patranobis, Principles of Industrial Instrumentation, Tata McGraw-Hill Publishing Co., New Delhi, 1999. (R1)
2. R.K.Jain, Mechanical and Industrial measurements, Khanna Publishers, Delhi 1999.(R2)
3. Eckman D.P.M, Industrial Instrumentation, Wiley Eastern Limited, 1990.(R3)
4. A.K. Sawhney, A course in Electrical and Electonics Measurement and Instrumentation, Dhanpat Raj and sons, New Delhi, 1999.(R4)
5. K.Krishnaswamy & S.Vijayachita, Industrial Instrumentation, New age International Private limited,2005.(R5)
6. Ernest O.Doebelin, Measurement systems application and design international student 4th Edition, Tata Mcgraw-Hill Publishing Co., New Delhi, 1999.(R6)
7. S.K.Singh, Industrial instrumentation and control, Tata McGraw-Hill Publishing Co., New Delhi, 2003.(R7)

Web Resource:

- http://www.adinstruments.com
- http://www.pacontrol.com/
- http://www.digital.ni.com/

Prerequisite : EI0303 Industrial Instrumentation

Objective:

1. To understand the purpose of instrumentation in Industrial processes.
2. To learn the working of different types of temperature measuring instruments like RTD, Thermistor, and thermocouple.
3. To study the Bourdon tube, diaphragms and Bell gauges for pressure measurement and to employ flapper-nozzle assembly for differential pressure measurement.

4. To study the various flow and level measurement devices used for industrial purposes.

Tenative Test Dates

Cycle Test-I : 30/7/2014
Cycle Test-II : 25/08/2014
Model Examination :20/10/2014

Test Portions

Cycle Test-I : Unit I and Unit II
Cycle Test-II : Unit III and Unit IV
Model Examination : All Five Units

Assessment details

Cycle Test-I	10 marks
Cycle Test-II	10 marks
Surprise Test 1	5 marks
Attendance	5marks
Model Exam	20 marks
External	50 marks
Total	100 marks

Outcomes

Students who have successfully completed this course

Course outcome	Program outcome
• The purpose of instrumentation in Industrial processes. • The working of different types of temperature measuring instruments like RTD, Thermistor, and thermocouple. • The Bourdon tube, diaphragms and Bell gauges for pressure measurement and to employ flapper-nozzle assembly for differential pressure measurement. • The various flow and level measurement devices used for industrial purposes.	**a:** The student will be able to check calibration on all instruments studied **b:** The student will be able to identify the proper careful handling and precautions for all types of instruments. **c:** The student will be able to understand that instruments must be intelligently used to minimize errors **d:** The student will be able to identify various techniques and procedures needed with a particular instrument. **e:** The student will be able to make calculations necessary with certain instruments. f: The student will be able to apply these instruments to gain information about typical electrical and electronic circuits.

Detailed Session Plan

Day	Name of the experiment	Reference
DAY 1	• Basics of measurements	R3, chap 1;
DAY 2	• Different parameters used in Industry	
DAY 3	• Temperature measurement using physical parameter	R1, chap 4;
DAY 4	• Electrical type temperature sensor	R1, chap 4; R3, chap 10;
DAY 5	• RTD, Thermistor	
DAY 6	• Thermocouple and laws of Thermocouple, Fabrication of Industrial Thermocouples	
DAY 7	• Discussions	
DAY 8	• Signal conditioning • Cold junction compensation	
DAY 9	• Special techniques for measuring high temperature	
DAY 10	• Radiation methods of temperature measurement	R1, chap 4; R5 chap1;
DAY 11	• Units of pressure • Different types of manometers	R5 chap1; R1 chap3;R7 chap 9;
DAY 12	• Elastic type pressure gauges • Bourdon tube bellows • Diaphragms • Bell Gauge	R7 chap9; R1 chap 3;
DAY 13	• Measurement of pressure using Electrical transducer	R1 chap3;
DAY 14	• Vaccum pressure measurement • Mcleod gauge • Thermal conductivity Gauges	
DAY 15	• Ionization gauge cold cathode and hot cathode types	
DAY 16	• Differential pressure measurement	
DAY 17	• Flopper • Nozzle Assembly	
DAY 18	• Discussions	
DAY 19	• Variable head type flow meters • Variable area flow meters	
DAY 20	• EM flow meter • Turbine flowmeter	
DAY 21	• Ultrasonic flowmeter	
DAY 22	• Vortex flowmeter • Dall tube	
DAY 23	• Surprise test 1	
DAY 24	• Discussions	
DAY 25	• Mass flow meter • Direct and Indirect methods	
DAY 26	• Open channel & solid flow measurement	

DAY 27	• Resistive, Inductive and capacitive methods	R5 chap 6;
DAY 28	• Measurement of level using Gamma rays	
DAY 29	• Ultasonic methods	R5 chap 6;
DAY 30	• Ultasonic methods	R5 chap 6;
DAY 31	• Measurement of liquid level using flow types	
DAY 32	• Measurement of liquid level using Displacer type	R1 chap 6; R5 chap 6;
DAY 33	• Solid level measurement	R1 chap 6;
DAY 34	• Hydrostatic types	R1 chap 6;
DAY 35	• Measurement of torque using strain gauge • Inductive principle	R5, Chap3;
DAY 36	• Digital methods • Magneto-strictive transducer	R5, Chap 3;
DAY 37	• Measurement of velocity using electromagnetic transducer	R4
DAY 38	• Moving magnet type • Moving coil type	R4
DAY 39	• Surprise test 1	
DAY 40	• Electromagnetic tacho generator • Stroboscope	
DAY 41	• Measurement of humidity using dry and wet bulb psychometers	
DAY 42	• Dew cell • Hygrometer	
DAY 43	• Measurement of density using pressure type desitometer	
DAY 44	• Measurement of density using float type and bridge type densitometer	
DAY 45	• Discussions	