

Course code	Course name	L-T-P-Credits	Year of Introduction
AE484	INSTRUMENTATION SYSTEM DESIGN	3-0-0-3	2016
Prerequisite : NIL			
Course Objective <ul style="list-style-type: none"> To equip the students with the basic Concept of Instrumentation system design To understand the construction and working of different instrumentation system 			
Syllabus Temperature measurement- Pressure measurement- Measurement of viscosity- Flow measurement- Anemometers- Target flow meters- Level measurement			
Expected outcome The students will be able to understand the concepts behind instrumentation system design and its working			
Text Books <ol style="list-style-type: none"> 1. E.O. Dobelin, Measurement Systems Application and Design, McGraw Hill, New York, 2003 2. Harry N Norton, Hand Book of transducers, PHI, 1989 			
Reference Books <ol style="list-style-type: none"> 1. Gregory K McMillan, Douglas M Conside, Process and Industrial Instrumentation Control, McGraw Hill, 5ed, 1999 2. John P Bentley, Principles of Measurement Systems, Pearson Education, 2004 			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Introduction: Concept of generalized measurement system, functional elements, generalized input-output configuration, static sensitivity, drifts, linearity, hysteresis, threshold, resolution, static stiffness and input-output impedance	7	15%
II	Transducers: Operating principle, construction and design of variable resistive transducers, variable inductive transducers, variable capacitive transducers, piezoelectric transducers, magnetostrictive transducers	7	15%
FIRST INTERNAL EXAMINATION			
III	Hall effect, eddy current, ionization, optical transducers, digital transducers, single shaft encoders, photo voltaic cell, photo conductive, photo emissive, fiber optic sensors, concept of smart and intelligent sensor, bio-sensors	7	15%
IV	Construction and performance of industrially important transducer for measuring displacement, speed, vibrations, temperature, electrical power, strain, torque Force, Design of intelligent instrumentation system.	6	15%
SECOND INTERNAL EXAMINATION			
V	Signal Conditioning & Recording (Part1): Quarter, half and full bridge circuit, active filters, differential instrumentation amplifiers, carrier amplifiers	8	20%
VI	Signal Conditioning & Recording (Part2): design of display elements, LED, bar graph displays, LCDs , nixie tube and their interfacing	7	20%

END SEMESTER EXAMINATION

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3 Hours

Part A

Answer any two out of three questions from Module 1 and 2 together. Each question carries 15 marks and may have not more than four sub divisions. (15 x 2 = 30 marks)

Part B

Answer any two out of three questions from Module 3 and 4 together. Each question carries 15 marks and may have not more than four sub divisions. (15 x 2 = 30 marks)

Part C

Answer any two out of three questions from Module 5 and 6 together. Each question carries 15 marks and may have not more than four sub divisions. (20 x 2 = 40 marks)



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