



Course Title: Intelligent Instrumentation

Credit Units:

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
3	1	0	0	4

Course Level: UG

Course Code: IE401

Course Objectives:

To get students familiar with interfacing of computer systems with the control theory thus making it an automatic system and to learn the PLC programming and its application in different process industries.

Pre-requisites:

Control System, Transducers & Applications, Computer networking, Communication Systems

Course Contents/Syllabus:

	Weightage (%)
Module I: Introduction to Intelligent Instrumentation system Necessity and functions of computers. Level of automation and economy of computer control. Centralized computer control Vs distributed computer control, Computer Architecture: Micro and minicomputer, functional models of I.O. system	15
Module II : Interfacing Sampling; Multiplexing; A/D and D/A converters, interfacing with different types of transducers - Analog / Digital, Electrical and non electrical selection of sensors; Micro computer interfacing standard buses Serial buses; Serial data communication protocols.	30
Module III: Structural Study of Automatic Process Control Fundamental of automatic process control, building block of automatic system, direct and distributed digital control system. Programmable controllers.	15
Module IV: Personal Computer in Real Life Environment Introduction, personal computer: system and facility, PC bus and signals, interrupts, interfacing PC with outer world, PC in RTE, Real time application of IBM PC PC based distributed control system	20
Module V: Programming and Application Modeling and simulation for plant automation, PLC Architecture and programming of PLC, industrial control application: cement plant,	20

thermal power plant, water treatment plant, steel plant	
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Student Learning Outcomes:

After completion of this course students will be to

1. Understand the concept of Intelligent instrumentation
2. Identify the optimized protocol selection according to the application area
3. Design complete automatic process control system
4. Analyze the PLC systems In industry

Pedagogy for Course Delivery:

- Class Room Lectures, assignments, Quiz, Case study

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
100	-	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

Text:

Computer based industrial control: Krishan Kant, PHI

References:

1. B.C. Nakra and K.K. Chaudhary, Instrumentation Measurement Analysis, Tata McGraw-Hill.
2. Instrumentation systems by Mani Sharma, Rangan., TMH
3. Measurement & Instrumentation principles by Alan S Morris, Elsevier
1. Measurement, Instrumentation and Sensors, Handbook by J.G. Webster