

Course Code	Course Title	L	T	P	C
1154EC103	INDUSTRIAL AUTOMATION	3	0	0	3

a) Course Category

Institutional Elective

b) Preamble

The purpose of this course is provide the knowledge of automation components, tools, machine to machine communication, internet of things involved in industrial automation

c) Prerequisite

Nil

d) Related Courses

Basics of embedded systems, Building Automation.

e) Course Outcomes

On successful completion of this course the student will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Emphasize the signals from automation components with Computer aided measurement	K2
CO2	Explain the concepts of tools used in industrial Automation.	K2
CO3	Familiarize the concept of various interfaces involved in DCS and applications of DCS	K2
CO4	Explain the need for machine to machine communication in automation	K2
CO5	Familiarize the concepts of internet of things and its application	K2

f) Correlation of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M	-	-	-	-	-	-	-	-	-	-	M	L	-
CO2	M	L	-	-	M	-	-	-	-	-	-	L	L	L
CO3	M	-	-	-	-	-	-	-	-	-	-	M	-	-

CO4	M	-	-	-	-	-	-	-	-	-	-	M	L	-
CO5	M	-	-	-	-	-	-	-	L	L	-	M	L	-

g) Course Content

UNIT I AUTOMATION COMPONENT AND COMPUTER AIDED MEASUREMENT 9

Sensors for temperature, pressure, force, displacement, speed, flow, level, humidity and pH measurement, Actuators, process control valves, Role of computers in measurement and control, Elements of computer aided measurement and control – man machine interface – process related interface.

UNIT II PLCandSCADA 9

Evolution of PLC – Sequential and Programmable controllers – Architecture – Programming of PLC – Relay logic and Ladder logic – Functional blocks – Communication Networks for PLC – SCADA introduction – elements of SCADA – Features of SCADA, Communications in SCADA types and components.

UNIT III DCS ANDITSAPPLICATION 9

DISTRIBUTED CONTROL SYSTEMS: Evolution – Different architectures – local control unit– Operator Interface – Displays – Engineering Interface

APPLICATION OF DCS: DCS Applications in power plants, Iron and steel plants, Chemical plants, Cement plants, paper and pulp industries

UNIT IV MACHINE TOMACHINECOMMUNICATION 9

Introduction – components of M2M – Features of M2M - Architecture of M2M – Requirements for M2M – Issues inM2M – Standardization effort for M2M – combination of wireless technology: WI-FI, wireless HART, ISA 100 –Industrial network equipment’s: Routers, gateways, switches, Applications ofM2M

UNIT V INTERNETOFTHINGS 9

Introduction – definition and characteristics of IoT – Things of IoT – IoT protocols – IoT functional blocks – IoT communication models – IoT enabling technologies: wireless sensor networks, cloud computing - Indoor air quality monitoring in industries – Difference between IoT and M2M –IoT for Plant automation - case study: Industrial control and smarthealth.

Total 45 Hrs

h) Learning Resources

Text Books

1. S.K. Singh, "Industrial Instrumentation and control" – The McGraw Hill companies 3rd edition – 2009. [UnitI]
2. Curtis D. Johnson "Prentice Process control Instrumentation Technology" – Hall India, 8th edition, 2006 [Unit II,III]
3. Thomas Hughes, "Programmable Logic Controller", ISA Publication.[UnitII].
4. Stuart A. Boyer, "SCADA supervisory control and data acquisition", ISA Publication.[UnitIII]
5. McMillan.G.K, "Process/ Industrial instrument and handbook", McGraw-Hill, New York, 1999 [UNITIV]
6. Machine- to-machine communications edited by vojislav B. misic, Jelenamistic, CRS press Taylor &francis group –2015.
7. Internet of Things: A hands on approach by ArshdeepBahga, Vijay madiseti Published by ArshdeepBahga, Vijay madiseti-2014. [UNITV]

Reference Books

1. Samuel M. Herb, "Understanding Distributed Processor Systems for Control", ISA Publication.
2. Thomas Hughes, "Programmable Logic Controller", ISAPublication.
3. Stuart A. Boyer, "SCADA supervisory control and data acquisition",ISA Publication
4. PoppovikBhatkar, "Distributed Computer Control for Industrial Automation", Dekkar Publication

Online Resources

1. www.nptel.com