

INDUSTRIAL AUTOMATION AND CONTROL

VI Semester: EEE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEEB58	OPEN ELECTIVE	L	T	P	C	CIA	SEE	Total
		3	-	-	3	30	70	100
Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil			Total Classes: 45	
<p>OBJECTIVES: The students will try to learn:</p> <ul style="list-style-type: none"> I The functionality of the basic elements of industrial automation systems and the fundamental principles of operation of numerous instruments and machines. II The various control techniques employed in process automation including programmable logic controllers. III The substantial applications of automation systems and analyze real-life problems from an automation perspective based on engineering and cost-oriented thinking. <p>COURSE OUTCOMES: After successful completion of the course, Students will be able to</p> <ul style="list-style-type: none"> CO 1 Illustrate the architecture of automation system for supervisory control of an industrial process. CO 2 Demonstrate the operating principles of various instruments for measuring variables in a controlled process. CO 3 Select an appropriate sensor and/or actuator for a given automated application. CO 4 Identify the suitable control technique to control a given process for achieving desired response. CO 5 Analyze the functionality of sequential and programmable logic controllers in an industrial application. CO 6 Illustrate the organization of programmable logic controller to familiarize numerous control modules in physical environment. CO 7 Construct sequential program, state machine model, sequential flow chat and ladder logic for automatic control of an industrial application. CO 8 Examine the functional and programming features of CNC machines to perform machining operation. CO 9 Analyze the constructional and functional aspects of actuators for controlling industrial process. CO 10 Choose an appropriate electric drive for an industrial application based on drive characteristics. CO 11 Build an automated system in perspective of cost effective and optimal specifications. 								
MODULE -I	INTRODUCTION TO INDUSTRIAL AUTOMATION AND CONTROL						Classes: 08	
Introduction to Industrial Automation and Control: Introduction to industrial automation and control architecture of industrial automation system, measurement systems specifications, temperature measurement, pressure and force measurement, displacement and speed measurement, signal conditioning circuits, errors and calibration.								

MODULE -II	PROCESS CONTROL	Classes: 10
Process control: Introduction to process control, PID control, controller tuning, implementation of PID controllers, special control structures, feed forward and ratio control special control structures: predictive control, control of systems with inverse response.		
MODULE -III	PROGRAMMABLE LOGIC CONTROL SYSTEMS	Classes: 09
Programmable logic control systems: introduction to sequence or logic control and programmable logic controllers, the software environment and programming of PLCs, formal modeling of sequence control specifications. Programming, programming of PLCs: sequential function charts, the PLC hardware environment.		
MODULE -IV	CNC MACHINES AND ACTUATORS	Classes: 10
CNC machines and actuators: Introduction to computer numerically controlled machines, control valves, hydraulic actuation systems, principle and components, directional control valves, switches and gauges, industrial hydraulic circuits.		
MODULE -V	ELECTRICAL MACHINE DRIVES	Classes: 08
Electrical machine drives: Energy savings with variable speed drives, step motors: principles, construction and drives, electrical actuators, DC motor drives, electrical actuators: induction motor drives, electrical actuators, BLDC motor drives.		
Text Books:		
<ol style="list-style-type: none"> 1. Madhu Chanda Mitra, Samarjit Sen Gupta, "Programmable Logic Controllers and Industrial Automation: An Introduction", Penram International Publishing (India) Pvt. Ltd., 1st Edition, 2008. 2. K Krishnaswamy, S Vijayachitra, "Industrial Instrumentation", New Age Publications, 1st Edition, 2010. 3. Rajesh Mehra, Vikrant Vij, "PLCs & SCADA: Theory and Practice", Laxmi publications, 2nd Edition, 2016. 		
Reference Books:		
<ol style="list-style-type: none"> 1. AK Gupta, S K Arora, "Industrial Automation and Robotics", Laxmi Publications, 2nd Edition, 2013. 2. Jon Stenerson, "Industrial Automation and Process Control", Prentice Hall, 1st Edition, 2002. 		
Web References:		
<ol style="list-style-type: none"> 1. https://www.google.co.in/search?q=introduction+to+industrial+automation+and+control&ie=utf-8&oe=utf-8&client=firefox-b-ab&gfe_rd=cr&ei=puocwoxvl67v8wekwzngaw 2. https://www.noorropidah.files.wordpress.com/2012/01/plc-1-3.pdf 3. https://www.radix.co.in/families/automation?gclid=cjfw24pbjtacfuyeaoadicqghq 		
E-Text Books:		
<ol style="list-style-type: none"> 1. https://www.plc-scada-dcs.blogspot.com/p/downloads.html 2. https://www.megawatt.com.gr/files/uploads/katalogos%20plc%20abb.pdf 		