

Course code	Course Name	L-T-P -C	Year of Introduction
EE488	INDUSTRIAL AUTOMATION	3-0-0-3	2016
Prerequisite : NIL			
Course Objectives <ul style="list-style-type: none"> • Explain the General function of Industrial Automation • Identify Practical Programmable Logic Controller Applications • Identify Types of Industrial Sensors • Explain Robotics 			
Syllabus Types of motion actuators, electrical and mechanical sensors, ladder diagrams, cascade method, Huffman method, Programmable Logic Controllers, Microcomputers: interfacing and programming, Principles of Robotics and applications			
Expected outcome. The students will be able to <ol style="list-style-type: none"> i. Know about motion devices and various in automation ii. Draw ladder diagrams for applications iii. Understand assembly language programs iv. Know about Robotic components 			
Text Book: 1. Pessen , Industrial Automation : Circuit Design and Components , Wiley			
References: 1. Bartelt , Industrial Automated Systems, Instrumentation and Motion Control, , Cengage 2. Mukhopadyay et al , Industrial Instrumentation, Control and Automation, Jaico Publishing House			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	Motion Actuators: Types of Motion and Motion Conversion, Electric Linear Actuators, Electric Rotary Actuators, Fluid-Power Linear Actuators, Fluid-Power Rotating Actuators	6	15%
II	Sensors: Binary vs. analog sensors, Electric Position sensors: Limit switches, photovoltaic sensors, ultrasonic sensors, inductive and capacitive and magnetic proximity sensors, Pneumatic position sensors: limit valves, back-pressure sensors, coiled spring sensors. Level, pressure, temperature and flow switches	6	15%
FIRST INTERNAL EXAMINATION			
III	Electric Ladder Diagrams: Ladder diagrams, sequence charts, Ladder diagram design using sequence charts, cascade method,: single and multi path sequencing systems with and without sustained outputs, Huffman method: sequential systems, stable and unstable states, state assignment.	6	15%
IV	Programmable Controllers: PLC construction, Programming the PLC, constructing ladder diagrams for PLCs,	6	15%
SECOND INTERNAL EXAMINATION			

V	Microcomputers :Microcomputers for control applications, architecture, computer interfacing, programmable interface adaptors, Ramping a step motor example.	8	20%
VI	Robotics and Numerical Control : Basic Robot Definitions, Basic manipulator configurations, Numerical Control Systems, Robot Kinematics, Robot Grippers, Robot Sensors, Robot Programming, General Considerations for Robot Applications	8	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hrs.

Part A: 8 compulsory questions.

One question from each module of Module I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

