VI SEMESTER

OPEN ELECTIVES – I (offered by the Department to other Department students)

INDUSTRIAL CONTROL TECHNOLOGY

Course code: 22EI651 **Credits: 03**
L: P: T: S: 3: 0: 0: 0 **CIE Marks: 50**
Exam Hours: 03 **SEE Marks: 50**
Total Hours: 40 Hours

COURSE OBJECTIVES:

1. To explore various control structures available in industry
2. To identify and analyse various sensors and actuators
3. To analyse the function various industrial controllers
4. To comprehend various modeling techniques and the procedure to develop model based controllers.

COURSE OUTCOMES: After completion of the course, the Students will be able to:

CO1	Infer various industrial control structures
CO2	Identify various sensors and actuators and analyse its working
CO3	Analyse the function of various industrial controllers
CO4	Comprehend various modeling techniques and the procedure to develop model based controllers.

Mapping of Course outcomes to Program outcomes and PSOs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3											
CO2		3										
CO3			3		3							
CO4		3										

Course Contents:

Module	Course Content	Hours
1	**MODULE 1 INDUSTRIAL CONTROL SYSTEMS** Embedded Control Systems: Architectures and elements, Implementation methods. Real-Time Control Systems: Architectures and elements, Implementation methods. Distributed Control Systems: Principles and functions, Architectures and elements, Implementation techniques.	**8**

2	**MODULE 2 INDUSTRIAL CONTROL ENGINEERING** Industrial Process Controls: Continuous process controls, Control methodologies: Open and closed loops, Industrial Production Automation: Definition and functions, Systems and components, Robotics and automation	**8**
3	**MODULE 3 SENSORS AND ACTUATORS** Industrial Optical Sensors: Color sensors, Scan sensors, Industrial Physical Sensors: Temperature sensors, Distance sensors, Industrial Measurement Sensors, Electric Actuator, Pneumatic Actuators, Hydraulic Actuators.	**8**
4	**MODULE 4 INDUSTRIAL PROCESS CONTROLLERS** Proportional-Integral-Derivative: PID control mechanism, PID controller implementation, PID controller tuning rules, PID controller software design. Batch Process Control: Batch control systems, Batch control mechanism.	**8**
5	**MODULE 5 PROCESS MODELING SIMULATION AND CONTROL** Industrial process modeling, Industrial system modeling, Identification for model-based control, Feed-forward control, Model predictive control, Internal models and robust controls	**8**

Self-Study Component:

Sl. No	Contents
1	Process Modelling and response of the Processes, ControlSystem Development using any simulation software

Note:

1. Questions for CIE and SEE not to be set from self-study component.
2. Assignment Questions should be from self-study component only.

Text Books:

1. Peng Zhang, Advanced Industrial Control Technology, Elsevier Inc, UK 2010
2. C.D .Johnson Process Control Instrumentation Technology, 8th Edition, Pearson Education Private Limited, New Delhi 2008.

Reference Books:

1. D.R Coughner , "Process Systems Analysis and control, 3rd edition , MC Graw Hill publications, New Delhi, 2017.
2. George Stephanopoulos Chemical Process Control, 4th Indian reprint, PHI Ltd., Delhi, 2015

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes
- Surprise Tests
- Assignments
- Simulations

Assessment Pattern:

CIE –Continuous Internal Evaluation Theory (50 Marks)