Code : CHE642
Course : PROCESS CONTROL AND INSTRUMENTATIONS
Level : Degree
Credit Unit : 4
Contact Hour : 5
Part : 5
[1 / 2 / 3 / 4 / 5 / 6 / 7 / 8]
Course Status [Core / Non Core] : Core
Prerequisite : Nil
Course Objectives : Upon completion of this module, students should be able to:
1. Construct P&ID.
2. Identify the suitable instrumentations for a particular system.
3. Design control system for a given process.
Course Description : This course begins with a discussion of principle concept, theory and terminologies of process control. It moves on to discuss the product hardware and software that implement the theory, and then proceeds to describe instrumentation examples and the system-design approaches suitable for variety of production processes.
Syllabus Content:

1.0 Introduction to Process Control System
   1.1 Significances of automatic control
   1.2 Standard P&ID drawing
   1.3 Construction P&ID of chemical processes
   1.4 Types of controllers

2.0 Control system architectures
   2.1 Field unit controllers
   2.2 DCS system
   2.3 SCADA system
   2.4 PLCs

3.0 Process Measurements and Instrumentations
   3.1 Level
   3.2 Temperature
   3.3 Flow
   3.4 Pressure
   3.5 Composition
   3.6 Others

4.0 Final Control Elements
   4.1 Control valves
   4.2 Metering pumps
   4.3 Solenoid valves
   4.4 Variable speed drives

5.0 Fundamentals of Feedback Control
   5.1 Concepts of feedback control
   5.2 SISO, IMC and adaptive control
   5.3 Laplace Transform and transfer functions
   5.5 Block diagrams

6.0 Industrial controller tuning strategies
   6.1 Performance Criterion
   6.2 Process characteristics
   6.3 Selection of controller modes
   6.4 Characteristics of PID controllers
   6.5 Tuning process controller
   6.6 Rules of thumbs in controller tuning

7.0 Advanced Control Systems
   7.1 Feed forward control
   7.2 Cascade control
   7.3 Adaptive control
   7.4 Fuzzy logic
   7.5 Neural Network
   7.6 Others
8.0 Special Topic
8.1 Current issues and developments in process control
8.2 Alarms, safety devices and interlocks

Teaching Methodology: Lectures, Tutorials, Computer Simulations and Laboratory experiments.

Assessment:
- Tests and Assignments: 30%
- Practical reports: 20%
- Examination: 50%


References: