

ADVANCED PROCESS CONTROL
(Major)

Module I:

A brief review on preliminary concepts of process control. Modeling of a few complicated systems. Understanding of first and second order systems and PID controllers. State space and transfer function matrix models. Stability criterion of transfer function matrix models.

Module II:

Development of empirical model from process data. Identifying discrete time models from experimental data. Design of Feedforward and Ratio control. Study of Cascade Control system.

Module III:

Digital Sampling, Filtering, and Control: Sampling period, Analog and digital filters, Z-transform. Use of SIMULINK, Design of digital controller. Multiloop Control. Calculation of extent of interaction and pairing of controlled and manipulated variable, Implementation of real time optimization in computer control. Study of Model Predictive Control (MPC), Concepts of Statistical process control.

Reference Books:

1. *Process Dynamics and Control, 3rd ed. by D E Seborg, T F Edgar, D A Mellichamp, and F J Doyle, John Willey & Sons.*
2. *Process Dynamics, Modeling, and Control by BAOgunnaike and W H Ray, Oxford University Press.*
3. *Process Control: Modeling, Analysis, and Simulation by BWBequette, PHI.*
4. *Computer Control of Processes by MChidambaram, Narosa Publishing House.*
5. *Process Systems Analysis and Control, 3rd ed. by DRCoughanowr and S E LeBlanc, McGraw-Hill.*