



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Chemical Process Dynamics and Control

CBE 4624

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

Study of the dynamics and control of chemical processes; mathematical models of simple processes, including feedback control, are derived, analyzed, and simulated.

Prerequisites and Co-requisites:

Prereq: 2523 (523) or 3610 (610), and enrollment in CBE major; or Grad standing, or permission of instructor.

Course Goals / Objectives:

- Be introduced to the modeling and analysis of the dynamic behavior of chemical processes
 - Be introduced to the basic theory and practice of automatic process control
 - Become familiar with the principles of single-loop feedback control and its design and analysis
 - Be introduced to improvements and modifications to single-loop feedback control
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Course Topics:

- Introduction to Process Control, Control objectives and benefits
 - Mathematical modeling, Dynamic modeling, linearization, Laplace transform
 - Transfer functions and block diagrams, Frequency response, Process dynamics.
 - Process dynamics, Process dynamics, model identification, Empirical model identification
 - Empirical model identification, Elements of feedback loop
 - Block diagram, performance measures, variables selection, The PID algorithm
 - The PID algorithm, PID controller tuning, Stability of control systems
 - Bode stability analysis, Veterans Day (no class), Nyquist stability analysis
 - Controller tuning methods, Review, Practical application of feedback control, control of non-linear processes
 - Performance of control systems, Enhancements to single-loop PID control, introduction to digital control, Summary
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Designation:

Required