CHE 734-101: Chemical Process Dynamics and Control

Patrick Robinson

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CHE 734 - Chemical Process Dynamics and Control (Fall 2020)

Course Description: Mathematical principles of process dynamics and control; derivation and solution of differential equations describing the behavior of typical chemical engineering processing units; and mathematical analysis and design of control systems. Digital and sampled data control systems also discussed.

Prerequisite: CHE 626 or equivalent. Corequisites: CHE 611, CHE 612 or equivalent


Please Note: Author is an NJIT professor and a great resource for questions!

Instructor: Dr. Patrick Robinson
Adjunct Professor, NJIT
Process Controls and Modeling Team Lead, Phillips 66 Bayway Refinery

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Office: (908) 523-5003

Lecture Hours: Synchronous online (Tuesday, 6:00pm – 8:50pm)

Office Hours: By appointment via email or phone

Credits: 3

Please note: Instructor works for the Phillips 66 Bayway Refinery in Linden, NJ. This facility operates 24 hours a day, 7 days a week, and every day of the year. In the case of a plant emergency and the instructor’s assistance is needed, the class will unfortunately be canceled. Expect an email prior to the class. IF NO EMAIL IS SENT, ASSUME CLASS IS ON TIME!!!

Week | Topic (Preliminary / Subject to change based on time)
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1 (9/1/20) | Introduction (Chapter 1)
2 (9/8/20) | No class September 8 as Monday Classes Meet
3 (9/15/20) | Mathematical Models (Chapter 2)
4 (9/22/20) | Linearization and Deviation Variables (Chapter 3)
5 (9/29/20) | Stability Considerations (Chapter 4)
6 (10/6/20) | Laplace Transforms of Linear Systems (Chapter 5)
7 (10/13/20) | Inverse Laplace Transforms (Chapter 6)
8 (10/20/20) | Transfer Function; Open-Loop Dynamic Responses (Chapter 7 & 8)
9 (10/27/20) | Midterm Examination
10 (11/3/20) | Closed-Loop Responses (Chapter 9)
11 (11/10/20) | Frequency Response Analysis (Chapter 10)
12 (11/17/20) | Stability Analysis of Feedback Systems (Chapter 11)
13 (11/24/20) | Design of Feedback Controllers (Chapter 12)
14 (12/4/20) | Feedback Control of Dead-Time Systems (Chapter 13)
TBD | Final Examination

Grading scheme: Homework 10%, Midterm Examination 30%, Project Assignment 30%, Final Examination 30%

Additional Readings: Provided prior to lectures for discussion, homework, and special topics

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