ChE 431 - Process Control

Code and Name: ChE 431 - Process Control
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Process systems analysis and control, Coughanowr, D.R, , 3rd Edition, McGraw-Hill, 2011

Other References:
- Chemical process control an introduction to theory, By Stephanopoulos, G., Prentice-Hall,INC

Course Description:

Closed loop control, Laplace transform, Response of first order systems, Response of higher order systems, Controllers and final control elements, Controller stability, Frequency Response and body stability

Pre-requisites: Math 235, ChE 326

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Explain the structure and type of process control for chemical plants. (1)
2. Analyze any PID diagram with identifying the required controlled variables, manipulated variables, and sources of disturbance (1)
3. Develop mathematical modeling for a chemical process. (2)
4. Design of different types of process control system such as feedback controller. (2)
5. Identify the highest cautions of process safety and quality by proper selection and design of control system (1)
6. Analyze a topic of recent subjects in chemical process control. (7)
7. Demonstrated the ability for self-directed learning (7)

Topics to be covered:

- Introductory Concepts, why process control , control systems
- Modeling for Process Dynamics,
- Response of First-Order Systems
- Response of higher-Order Systems
- Polymerization processes
- Linear closed loop systems
- Block Diagram of a Chemical-Reactor for Control System
- Closed loop transfer functions and transients response
- Controller stability

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.