CBE 470: Process Dynamics and Control, Spring 2017
Course Website: http://zavalab.engr.wisc.edu/teaching/cbe470spring2017

Overview: This course is intended to introduce undergraduate chemical engineers to dynamics and control of chemical processes and other engineering systems. The course is evenly divided between modeling and analysis of dynamic behavior, and design and analysis methods for automatic control.

The course is structured as follows. The *lectures* introduce the concepts and present the main ideas. The students are expected to read the textbook for the details not covered in class. **Lectures** are held three times per week:

MWF 11:00-11:50 pm @ EH 3032

The ***homework*** problems and computer assignments enable the student to practice and become proficient at applying the methods. The solution of homework problems is an important part of the course. Homeworks will be due on Fridays and will be submitted in class. **All homeworks should be submitted via Gradescope**. Keep a copy of the original for your records.

The **discussion sessions** are used to answer questions from previous lectures and go over examples to reinforce concepts. *Discussion* sessions are held once per week:

M 1:20-2:10 pm @ Engr Hall 2255

*A **control laboratory*** is an integral part of the course. The laboratory enables the students to develop expertise in collecting and analyzing data, identifying models from data, and implementing controllers on real processes. The laboratory meets once per week with **lab sessions starting on the 5th week** (week of February 13th-17th). The times of the lab sessions are:

Section A: M 2:25-5:25 pm @ 1102C Engr Hall, Instructor: Ranjeet Kumar
Section B: T 1:20-4:20 pm @1102C Engr Hall, Instructor: Apoorva Sampat
Section C: W 1:20-4:20 pm @1102C Engr Hall, Instructor: Travis Arnold
Section D: Th 1:20-4:20 pm @1102C Engr Hall, Instructor: Jordan Jalving

The students are required to **read the material provided for each lab exercise before the lab period** in order to be well prepared and not waste time. The **lab manual** contains detailed information about the lab report format. Lab reports are due at the beginning of the lab period following the one in which the experiment was performed. Ten points are subtracted for each day the report is late. The last laboratory experiment extends over four weeks and is the final project. *The final project report is due at 5:00 p.m. on the last class day.* There is a 30% penalty for a late project report.

Prerequisites: Momentum and Heat Transfer Operations (CBE 326) and Chemical Kinetics and Reactor Design (CBE 430). A working knowledge of computer programming, as covered in Introduction to Process Modeling (CBE 255).

Textbook and Lab Manual: We will use the textbook "Process Dynamics, Modeling and Control" (Ogunnaike and Ray, 1994). A **laboratory manual** and is available in the course website. The lab manual contains useful information on Matlab.

Grading: 2 Exams 30%, Final 25%, Lab 25%, Project 10%, Homework 10%

Exam Schedule: Midterm exams will be given in the evening. You must notify the instructor a week before an exam if you will be unable to take the exam at the scheduled time. The final exam can only be given at the scheduled time. All exams are closed book. The exam dates are:

Exam I: **Tu, February 21st, 7:15-9:15 pm**
Exam II: **Tu, March 14th, 7:15-9:15 pm**
Final Exam: **Sat, May 6th, 10:05-12:05 am**

Academic dishonesty: You are encouraged to discuss homework problems and computing assignments with other students in the course. However, all assignments that are turned in for grading are to be your work. They are not to be copied from another student's solution or a homework file. All computations are to be done on your own computer accounts. No files are to be simply copied from another student (this can be identified quite easily by an experienced programmer). If anyone needs a clarification about scholastic dishonesty, please see the instructor.

Contact information:
Instructor: Victor M. Zavala victor.zavala@wisc.edu
Office Hours: W 2-3 pm, Th 1-2 pm, EH 2012

TA Office Hours: W 2:30-4:30pm, EH 3345

T.A.s: Ranjeet Kumar rkumar32@wisc.edu
Apoorva Sampat asampat@wisc.edu
Jordan Jalving jalving@wisc.edu
Travis Arnold tjarnold@wisc.edu

Lab Instructor: Eric Codner edcodner@wisc.edu

Important Dates
Lectures: MWF 11:00-11:50 pm @ EH 3032
Discussion Sessions: M 1:20-2:10 pm @ Engr Hall 2255
Instructor Office Hours: Th 1 pm-3 pm, EH 2012
TA Office Hours: W 2-3 pm, Th 1-2 pm, EH 2012
Lab Sessions: Starting on 5th Week (February 13th-17th) @ Engr. Hall 1102C
Exam I: Tu, February 21st, 7:15-9:15 pm
Exam II: Tu, March 14th, 7:15-9:15 pm
Final Exam: Sat, May 4th, 10:05-12:05 am
Final Project Report Due: May 6th, 5:00 pm