Course Information

Classroom meetings:

Section 100: MWF 8:30-9:20 a.m. BIOT A115
Section 200: MWF 9:30-10:20 a.m. BIOT A115
Laboratory: M,T,W,R or F 2:30-5:00 p.m. BIOT B171/B180

Text:  
*Process Dynamics and Control, Third Edition*
by Dale E. Seborg, Thomas F. Edgar, Duncan A. Mellichamp and Francis J. Doyle III

Other Materials:  

Note: Another type of lab book or one previous used in another course is unacceptable.

Course Content:

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Meetings</th>
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</thead>
<tbody>
<tr>
<td>Introduction, Modeling, and Math Background</td>
<td>7</td>
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<tr>
<td>Process Dynamics</td>
<td>10</td>
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<tr>
<td>Controllers and Instrumentation</td>
<td>5</td>
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<tr>
<td>Process Safety and Associated Instrumentation</td>
<td>2</td>
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<tr>
<td>Control System Design</td>
<td>10</td>
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<tr>
<td>Frequency Response</td>
<td>4</td>
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<tr>
<td>Additional Control Strategies: Feedforward, Cascade, etc.</td>
<td>5</td>
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</tbody>
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Lab Book: 14 laboratory meetings

Rotation 1: 1/17 - 2/20 theme: basic instrumentation and software assigned groups
5 labs: pump/valve circuit, characteristic curves of ΔP vs. flow rate
LabView 1: tutorial
pressure calibration using dead weight tester and calibrator unit
programmable-logic control (PLC) basics & simulation
thermocouple, thermometer and thermistor calibration

Rotation 2: 2/21 - 4/3 theme: dynamic testing reassigned groups
5 labs: process dynamics with the LoopPro simulation software
LabView 2: data acquisition, display & storage
PLC logic circuits, signal I/O
dynamic testing of heat exchanger or fluid standpipe module
pulse testing of chemical reactor, CSTR and PFR

Rotation 3: 4/4 – 5/1 theme: controller tuning student-selected groups
4 labs: temperature control of reactors: CSTR and PFR
PLC applications: batch process
LabView 3: heat exchanger temperature or fluid standpipe level
process control with the LoopPro simulation software
Examinations:

Mid-term exams: Week of February 20th  Combined section exams will be in the evening
            Week of April 10th  Dates and locations TBD

Final exam:
Section 100: Tuesday, May 9th, 7:30 a.m. - 10:00 a.m., BIOT A115
Section 200: Thursday, May 11th, 7:30 p.m. – 10:00 p.m., BIOT A115
NOTE: I am looking into scheduling a common final time for both sections

Homework assignments:  - one per week, generally, assigned/due Friday
                        - 11 assignments, typically 4-to-6 problems from the text
                        - group work is required, groups will consist of 4 students and register on D2L
                        - lowest homework grade will be dropped

CU Learn pre-class quizzes:  - reading quiz to be completed in 24-hr window up to one hour before the first
                              class meets (i.e. 7:30 AM) on the day the reading assignment is due
                              - The 2 lowest quiz scores will be dropped

In-class workshops:  - frequent group or individual workshop exercises, active-learning format (graded on
                     random days for attendance and/or content).
                     - The lowest 5 workshop scores will be dropped. After that, none will be excused.

Grading basis:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Laboratory work</td>
<td>25%</td>
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<tr>
<td>Homework assignments</td>
<td>15%</td>
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<tr>
<td>Pre-class quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>In-class workshops</td>
<td>10%</td>
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<tr>
<td>Mid-term exams</td>
<td>25%</td>
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<tr>
<td>Final exam</td>
<td>20%</td>
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Other Information:

1. In-class workshops. Class meetings will be held in BIOT A115. The emphasis will be on group exercises
with the instructor being available for help and coaching. Although this mode of instruction can provide for a
more interesting, lively class, it does require your participation and places a premium on your preparing for
class, attending class, and arriving on time. As a courtesy to the instructors and your fellow classmates, all
cell phones, text messaging devices, music players, etc. that can cause distractions during classtime should
be turned off. If you need to receive or make a communication during this time, please do so outside of the
lecture room.

2. Homework assignments provide a major opportunity for learning in this course. Students will work on
homework in self-selected groups of 4 students throughout the semester. If students cannot find a group,
they will be assigned to one. Note, in order to do well on the exams, all students should work on all
homework problems. They can do this as individuals or in their group. Just prior to handing in the
homework, the group will agree upon a single group member’s homework that will be uploaded to the
group’s D2L Dropbox site as the final submission for the entire group. Lean authorship should be rotated by
assignment within the group and the lead author should be the first name on the assignment.
3. **Quality of presentation of written work.** Written work in this course must meet a quality standard. If it does not, it will be returned to the student ungraded and a zero grade will be recorded. Presentation must be neat and organized. Problem solutions involving derivations and calculations must include explanatory comments between steps and results must be set off clearly. Homework assignment solutions must be on standard green engineering paper or white paper if hand-written (neatly) or on white paper if typed or computer-printed. Multiple pages must be stapled in the upper left-hand corner. Laboratory exercises must be documented in a standard bound laboratory notebook. Take the time to make your work presentable!

4. **Deadlines and late work.** As a general rule, late work is not accepted. Assignments are due at the beginning of class and are late if handed in after the first 15 minutes of class. Exceptions are made in the case of serious illness, if the instructor is informed of the illness prior to the start of class and if the request for an exception is eventually supported by a doctor’s note. Arrangements should be made well in advance in the case of trips out of town (only those involving job interviews, graduate school recruiting, CU sports team travel, or urgent family matters). Work will normally be due in advance of such trips. Labs can only be made up if planned for in advance of due date.

5. **Class and lab attendance.** To be successful in this course, you must attend class and lab. It is important that you arrive on time. If you are going to arrive more than 10 minutes late for class, you should not come at all. If you are going to arrive more than 15 minutes late for lab, you should not attend. If you have a personal problem with punctuality, you should plan to arrive early.

6. **Website and email.** A course website has been established through Desire2Learn (D2L). This website will contain some basic information on the course, but is not intended to duplicate all announcements, deadlines, etc. communicated during class or via email. A course e-mail list has been established, and all students who are registered for the course are automatically subscribed. Although most course information will be transmitted during classtime, email will be used for various announcements regarding homework questions, feedback on exams, etc. Thus, students are expected to check their email on a regular and frequent basis.

7. **Grading concerns.** If it is believed that any material (homeworks, exams, etc.) has been graded incorrectly, please resubmit it to me within one week for re-grade of entire material. Include cover page that describes specific concerns on grading.

8. If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with me.

9. **Campus policy regarding religious observances requires that instructors make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Consult with your instructor about absences related to religious observances.** See full details at [http://www.colorado.edu/policies/fac_relig.html](http://www.colorado.edu/policies/fac_relig.html)

10. **Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran’s status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student’s legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.** See policies at [http://www.colorado.edu/policies/classbehavior.html](http://www.colorado.edu/policies/classbehavior.html) and at [http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code](http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code)

11. **The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. The University of Colorado does not discriminate on the basis of race, color,
national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status in admission and access to, and treatment and employment in, its educational programs and activities. (Regent Law, Article 10, amended 11/8/2001). CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, or veteran status. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. Information about the ODH, the above referenced policies, and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://hr.colorado.edu/dh/

12. All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://honorcode.colorado.edu