Department: ELEC  Number: 442
Course Title: Electronic and Pneumatic Process Control Systems  Units: 4.0
Hours/Week: Lecture: 3  Lab: 3  By Arrangement: 0
Length of Course: Semester-long
Grading: Letter

1. Prerequisite (Attach Enrollment Limitation Validation Form.)
   Completion of ELEC 441 with a grade of C or higher or equivalent

2. Corequisite (Attach Enrollment Limitation Validation Form.)
   None

3. Recommended Preparation (Attach Enrollment Validation Form.)
   None

4. Catalog Description (Include prerequisites/corequisites/recommended preparation.)
   A practical course in industrial electronic and industrial pneumatic control systems. Calibration theory, a review of transmitter calibration, electronic systems, pneumatic systems, controller operation, control loop theory, PID, loop tuning, and control loop troubleshooting are stressed. (CSU)

5. Class Schedule Description (Include prerequisites/corequisites/recommended preparation.)
   Same as above

6. Student Learning Outcomes (Identify 1-6 expected learner outcomes using active verbs.)
   Upon successful completion of the course, the student will be able to:
   1. perform the calibration of and describe how to troubleshoot electronic and pneumatic temperature controllers;
   2. perform the calibration of and describe how to troubleshoot electronic and pneumatic pressure controllers;
   3. perform the calibration of and describe how to troubleshoot electronic and pneumatic flow controllers;
4. describe various feedback control modes (PID), describe the methods used for control loop tuning, and perform P, PI, and PID loop tuning;
5. identify system errors and troubleshooting techniques

7. Course Objectives (Identify specific teaching objectives detailing course content and activities. For some courses, the course objectives will be the same as the student learning outcomes. If this is the case, please simply indicate this in this section).

Same As above

8. Course Content (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, you may attach a sample course syllabus with a timeline.)

1. Principles of calibration
2. Primary calibration standards
3. instrument errors
4. review on instrument calibration
5. feedback control
6. transmitters
7. controllers, indicators, and recorders
8. basic principles of loop tuning
9. instrument loop troubleshooting
10. pneumatic instrument theory
11. air supplies and regulators
12. pneumatic transmitters and recorders
13. pneumatic controllers
14. relays and transducers
15. basic and transducers
16. basic control valves
17. body and trim maintenance
18. actuator maintenance
19. positioner maintenance
20. Pneumatic test equipment

9. Representative Instructional Methods (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Include examples of out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills.)

1. Lectures
2. analytical problem sets
3. essay question sheets
4. topic reading assignments
5. assigned computer simulation activities

10. Representative Methods of Evaluation (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

1. Graded problem sets
2. graded homework word problems
3. computer based simulation activities
4. quizzes
5. midterm exam
6. final exam
11. **Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)


CSM Course Notebook

Prepared by:  

(Signature)

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