College of San Mateo
Course Outline

☐ New Course
☒ Update/No change
☐ Course Revision (Minor)
☐ Course Revision (Major)

Date: Nov. 16, 2006
Removed HBA Fall 2010

Department: ELEC **Number:** 444

Course Title: Automated Process Control System Design **Units:** 4.0

Hours/Week: **Lecture:** 3 **Lab:** 3 **By Arrangement:** 0

Length of Course
- ☒ Semester-long
- ☐ Short course (Number of weeks___)
- ☐ Open entry/Open exit

Grading
- ☒ Letter
- ☐ Credit/No Credit
- ☐ Grade Option (letter or Credit/No Credit)

1. **Prerequisite** (Attach Enrollment Limitation Validation Form.)

Completion of ELEC 442 with a grade of C or better 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 process contorl system design and tuning. integration of sensors, transmitters, indicators, contorllers and final control elements. Documentation of system (P&ID), 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. Layout and spec the equipment needed for a basic feedback control system
2. layout and spec the equipment needed for a basic feedbackward control system
3. layout and spec the quipment needed for a basci cascade and ratio contorl system
4. demonstrate skill using piping and instrumentation diagram (P&ID)
5. explain SCADA system operation
6. demonstrate a distributed control system

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. Review of feedback control
2. process control modes
3. process characteristics
4. process variables
5. instrumentation symbols
6. instrument loop diagrams
7. process and instrumentation diagrams
8. sensor and transmitter selection
9. pneumatic and electronic controllers, indicators, and recorders
10. tuning basics
11. proportional tuning
12. integral tuning
13. proportional and integral tuning
14. derivative tuning
15. proportional and derivative tuning
16. proportional, integral, and derivative tuning
17. instrument loop troubleshooting
18. introduction to distributed control
19. DCS maintenance
20. Data communications
21. Data communications maintenance
22. networking and fiber optics
23. fundamental of batch processes
24. principals of continuous process control
25. Systems simulation using AUTOSIM—Process control software lab
26. system documentation using AutoCAD Lite and Appropriate Instrumentation/process Control symbol Library

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.)

Process Instrumentation and Control Handbook. By Considine, Douglas. MacGraw-Hill, copyright 2004.
CSM Course Notebook

Prepared by: _____
(Signature)

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