Course Outline

Course Title: Controllers and Control Loops
Semester Course Prefix and Number: PAS 2277
Old Quarter Course Prefix and Number:
Number of Credits: 2
Semester(s) Offered: Spring
Class Size: 24
Number of Lecture Credits: 1
Number of Lab Credits: 1
Number of Lab Hours: 2
Number of Studio/Demonstration/Internship Credits:

Course Purpose Code:
- 0 - Developmental Courses
- 1 - Non-transferable, General Education
- X - Technical course related to career programs
- 3 - College course which has the primary goal of applying certain concepts (e.g. vocal ensemble)
- 4 - Other college course not considered a part of general education (MN TC) (e.g. computer science, health, physical education)
- 5 - Course which is intended to fulfill the Minnesota Transfer Curriculum (MNTC) requirements or intended for transfer.
- 9 - Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

Catalog Description:
This course covers the core of industrial process control, control loops and controllers. The course defines the components, configuration, installation, and I/O calibration of control loops. Analysis of control modes and algorithms for PID control are studied and practiced in a lecture/lab environment. Control mode design and system architecture completes the study.

Prerequisites and/or recommended entry skills/knowledge:
Course Prerequisite(s): EIAT/PAS 1253, EIAT/PAS 1233, EIAT/PAS 1243, EIAT/PAS 1295, & EIAT/PAS 1244
Reading Prerequisite: None
Composition Prerequisite: None
Mathematics Prerequisite: None

Career Programs and Transfer Majors Accessing this Course:
Process Automation Systems Diploma
Process Automation Systems AAS

Minnesota Transfer Curriculum Goal(s) partially met by this course if applicable:
(Notes: No more than two goals may be met by any one course. Curriculum Committee review and the Chief Academic Officer's approval are required.)

0. X None
1. ___ Communications
2. ___ Critical Thinking
3. ___ Natural Sciences
4. ___ Mathematical/Logical Reasoning
5. ___ History and the Social and Behavioral Sciences
6. ___ The Humanities and Fine Arts
7. ___ Human Diversity
8. ___ Global Perspectives
9. ___ Ethical and Civic Responsibility
10. ___ People and the Environment
Learning Outcomes: (including any relevant competencies listed in the Minnesota Transfer Curriculum)

Following the completion of this course the student will be able to demonstrate the ability to:

1.) Explain the functions of proportional, integral and derivative control actions.
2.) Calculate the effects of both the proportional and integral control actions.
3.) Configure both a flow and temperature PID control loop in the Allen Bradley Control Logix PLC
4.) Trend PID controller I/O variables in the Allen Bradley Control Logix PLC
5.) Hand tune a flow PID controller using the Ziegler-Nichols closed loop tuning method
6.) Tune a flow PID controller using the Techimation Protuner software package.

Student Assessment Methods:

Lab assignments, worksheets, papers, and tests.

Use of Instructional Technology: (includes software, interactive video and other instructional technologies):

Power Point Software, videos, software based lab simulators.

Outline or Statement of Major Course Content:

See “Learning Outcomes” above.

Additional Special Information: (special fees, directives on hazardous materials, etc.)

Laptop Computer Lease

Transfer Information: (Please list colleges/majors that accept this course in transfer.)

None

Approvals:

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Distribution: Original – Administrative Office
Copies: Curriculum Committee Chair, AASC Chair, Transfer Specialist, Originating Faculty Member, Scheduler, Records, Student Services, Learning Center, Library
Revised: October 2006