MESABI RANGE COMMUNITY & TECHNICAL COLLEGE

Course Outline

Course Title: Controllers and Control Loops
Semester Course Prefix and Number: PAS 2277
Old Quarter Course Prefix and Number:

Submitted By: Scott Norcia
Approval Date:
Revision Date: 11/23/11

Number of Credits: 2
Semester(s) Offered: Spring
Class Size: 24
Negotiated by AASC on: (date)

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__ **2** – 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 (MNTC) (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 Techmation 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:

Body	Representative Signatures	Date
Curriculum Committee		
Faculty Association		
Academic Affairs Standards Committee		
Chief Academic Officer		

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