

# MESABI RANGE COMMUNITY & TECHNICAL COLLEGE

## Course Outline

Course Title: Introduction to Process Control  
Semester Course Prefix and Number: PAS 1275  
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
- 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 is an introduction to industrial process control. The course will cover basic definitions, types of control, symbols and prints, instruments used in control, and elementary control loop design. The course will identify the duties and tasks performed by instrumentation technicians. The course is a prerequisite to additional instrumentation courses offered by Mesabi Range College.

### 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.)

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|--|--|
| 0. <input checked="" type="checkbox"/> None                                | 6. <input type="checkbox"/> The Humanities and Fine Arts     |
| 1. <input type="checkbox"/> Communications                                 | 7. <input type="checkbox"/> Human Diversity                  |
| 2. <input type="checkbox"/> Critical Thinking                              | 8. <input type="checkbox"/> Global Perspectives              |
| 3. <input type="checkbox"/> Natural Sciences                               | 9. <input type="checkbox"/> Ethical and Civic Responsibility |
| 4. <input type="checkbox"/> Mathematical/Logical Reasoning                 | 10. <input type="checkbox"/> People and the Environment      |
| 5. <input type="checkbox"/> History and the Social and Behavioral Sciences |  |

**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. identify the stages of control functions
2. define process control
3. define terms used in process control
4. define what a process is and give examples of processes.
5. describe and give examples of process parameters.
6. list and describe the fundamental stages of control functions.
7. define process control and terminology.
8. identify the terms associated with the components of control systems.
9. identify the function, purpose and location of different instruments in a control loop.
10. identify instruments for making physical and chemical measurement
11. describe the method used to convert physical/chemical action or effects
12. define terms used describe instrument characteristics
13. identify the functions of transducers in control loops.
14. identify functions provided by signal conditioners.
15. identify types of signals used to transmit information in control loops.
16. describe "Smart Transmitters" advantages over conventional transmitters
17. identify the terms associated with final control elements.
18. identify and describe the operation of final control elements.
19. describe methods and devices used to actuate final control elements.
20. describe the operation and use of signal conditioners for final control elements.
21. describe the operation of controllers
22. describe the different types of control modes
23. identify the basic input and output of controllers
24. define tuning parameters
25. diagram four types of control loops
26. associate each type of control loop to specific control applications
27. identify symbols and diagrams used in process control to illustrate the type, application, and location of instruments
28. identify instrument drawing connection lines used to define the types of signals that interconnect instrumentation devices.
29. identify logic symbols defining the function of relays, transmitters and controllers.
30. identify symbols representing primary and final control elements.
31. Identify types of wire used for instrumentation
32. Identify environmental problems that can effect instrument signals
33. Identify proper techniques and wiring practices for instrumentation wiring
34. Lay-out wiring for control loops

**Student Assessment Methods:**

Lab assignments, worksheets, papers, and tests.

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

PLCs, Programming software, and analog devices.

**Outline or Statement of Major Course Content:**

This course will focus on the basic applications of process control. The course will identify terminology used in process control, the types of process control, identify common measured variables, and equipment used for measurement and control.

**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