

MESABI RANGE COLLEGE

Course Outline

Course Title: Automated Industrial Control
Semester Course Prefix and Number: ECM 2276
Old Quarter Course Prefix and Number:

Submitted By: Scott Norcia
Approval Date:
Revision Date: 9/6/16

Number of Credits: 5 **Number of Lecture Credits:** 0
Semester(s) Offered: Spr **Number of Lab Credits:** 5 **Number of Lab Hours:** 10
Class Size: 24 **Number of Studio/Demonstration/Internship Credits:**
Negotiated by AASC on:
(date)

Course Purpose Code:

- 0 – Developmental Courses
- 1 – Non-transferable
- 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 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:

The course is a "Hybrid" or "Blended" course with the majority of the learning environment traditional in-class lectures and hands-on lab work which also includes Web-based learning activities to complement face-to-face work. This course covers advanced automated control for medium and large industrial manufacturing with an emphasis on concepts related to analog (process) control. Included in this project based course will be topics related to pre-engineering and design, mechanical installation/wiring, digital and analog control loops within the PLC, SCADA/HMI development and implementation as well as the integration into the project of DeviceNet and Foundation Fieldbus advanced field level network devices.

Prerequisites and/or recommended entry skills/knowledge:

Course Prerequisite(s): ECM 1253, ECM 1233, ECM 1243, ECM 1295, & ECM 1244
Reading Prerequisite: None
Composition Prerequisite: None
Mathematics Prerequisite: None

Career Programs and Transfer Majors Accessing this Course:

Electrical Controls and Maintenance Diploma
Electrical Controls and Maintenance 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. AASC review and the Chief Academic Officer's approval are required.)

- 0. 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)

Upon completion of this course, the student will be able to:

- 1.) Install and integrate basic field devices.
- 2.) Configure a PLC for continuous discrete level and analog, flow and temperature control.
- 3.) Configure and tune a PID controller
- 4.) Implement a SCADA/HMI system.
- 5.) Implement basic industrial fieldbus systems, (analog and digital).
- 6.) Configure remote PLC communications using Ethernet/IP
- 7.) Document an integrated process.
- 8.) Troubleshoot an integrated process.

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.

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

Laptop Computer Lease and Required Tool List

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

None

Affiliated Mesabi Range College Courses and Programs:

Approvals:

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

Distribution: Original – Instructional Services
Copies: Transfer Specialist, Originating Faculty Member, Records
Revised: December 2012