Course Title: Automated Process Control

Submitted By: SRN
Semester Course Prefix and Number: ECM 2276
Approval Date: 11/12/19
Old Quarter Course Prefix and Number:
Revision Date: 10/22/19

Number of Credits: 7
Number of Lecture Credits: 1
Number of Lab Credits: 6
Number of Lab Hours: 12
Class Size: 24

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.
6 – Continuing Education/Customized Training specialized credit course (not occurring in 0-5)

Catalog Description:

This course is designed to facilitate the application of previous classroom/lab instruction on basic Programmable Logic Controllers (PLC’s), analog measurement devices, basic Ethernet networking, computer aided design and the basics of analog process control systems. This course will require that students, working in small groups, apply previous learned concepts to the design, configuration and commissioning of a functionally correct PLC based control system to be implemented on existing biodiesel processing stations. Included in this project will be the requirement to plan and implement a project timeline, as well as the requirement that the final project be properly documented.

Prerequisites and/or recommended entry skills/knowledge:

Course Prerequisite(s): ECM 1251, 1252, 2264, 2266, 2267
Reading Prerequisite:
Composition Prerequisite:
Mathematics Prerequisite:

Career Programs and Transfer Majors Accessing this Course:

Electrical Controls and Maintenance Diploma and 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. Understand and adhere to lab safety protocols
2. Work cooperatively with others
3. Understand the importance of project pre-engineering and design
4. Properly use PC based software packages for data management and documentation
5. Effectively resource manufacturer's operation/installation reference materials
6. Identify system component specifications
7. Adhere to installation and design standards
8. Demonstrate the ability to achieve high levels of craftsmanship
9. Utilize manufacturer specific configuration software
10. Relate previous instruction related to control of analog processes
11. Relate previous instruction related to analog measurement devices
12. Relate previous instruction related to PLC installation and configuration
13. Appropriately range and scale analog field devices
14. Configure and utilize Ethernet communications protocols in field and final control devices
15. Configure and apply a DeviceNet network the exchange of discreet data in an integrated system
16. Configure a PLC to control a batch process to produce finished biodiesel fuel
17. Configure a functional HMI system to supervise and control the biodiesel processing system
18. Develop a comprehensive project documentation package
19. Manage time in an efficient manner
20. Develop the attendance and productivity skills required in the workforce

**Student Assessment Methods May Include:**

Lab and Homework Assignments, Quizzes and Written Tests

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

PowerPoint, PC Based Exercises and Sourcing of Online Information.

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

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

Bemidji State University's Applied Engineering BS degree and Technology Management BS degree.

**Affiliated Mesabi Range College Courses and Programs:**

**Approvals:**

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**Distribution:** Original – Instructional Services

**Copies:** Transfer Specialist, Originating Faculty Member, Records

**Revised:** February 2019