DEPT: Renewable Energy Technology  COURSE NO. RNEW 2165

NUMBER OF CREDITS: 1  COURSE TITLE: Instrumentation & Control Lab

CATALOG DESCRIPTION:
This lab course, geared toward on-campus students, will fulfill one of the technical elective credits for the Renewable Energy Technology Program. This lab gives hands on exposure to the essential elements of a process control system. It will cover common types of electrical and pneumatic signals used for data collection while exploring devices used to measure flow rate, pressure, temperature, level and analytical control. This course will compare fundamental control concepts such as on/off and PID. It will explain how control concepts are used in the various control loops of feedback, cascade, ratio, and feedforward.

AUDIENCE:
This course is designed to provide plant operators and entry-level instrument mechanics, basic knowledge of common process instrumentation and control schemes. This course will cover an introductory look at the fundamental principles of automatic process control.

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:
This course will run concurrent course with Instrumentation & Control Theory.

LENGTH OF COURSE: 1 credits (0 lecture, 1 lab, 0 other)

THIS COURSE IS USUALLY OFFERED:
Every other year ☐  fall ☐  spring X  summer ☐  undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The student will acquire the understanding of how to identify, utilize, and implement process sensors in a control system.

2) THINKING SKILLS: The student will understand the information required to apply the components and concepts discussed in this course.

3) COMMUNICATIONS SKILLS: The student will demonstrate both written and oral communication skills.

4) HUMAN DIVERSITY: The student will gain self-awareness regarding the feelings towards people regardless of culture, values or socioeconomic status.

TOPICS TO BE COVERED:
1. Define the general function of process instrumentation and the most common process variables monitored by process instrumentation.

2. State the general function of an instrument system and identify the basic instruments/devices and the function of each.

3. Identify basic operator responsibilities associated with process control.

4. Describe the functions of the basic elements of an automated process control system.

5. Describe feedback, feed forward, and cascade control and explain how they can be used in a process control system.

6. Explain the general operation of a complex PID process control scheme.

LEARNING/TEACHING TECHNIQUES used in the course are:
X Collaborative Learning    X Problem Solving
X Student Presentations  X Creative Projects
X Lecture                  X Demonstrations
X Lab                      X Other (describe below)

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:
X Reading                   X Tests                  X Individual Projects
X Oral Presentations       X Worksheets             X Collaborative Projects
X Textbook Problems        X Papers                 X Portfolio
X Group Problems           X Term Paper
X Other (describe below)

EXPECTED STUDENT LEARNING OUTCOMES:
The student will understand the fundamental concepts of programmable controls: hardware identification and application, and system testing. The course will also cover the calibration and troubleshooting of equipment used to measure flow rate, pressure, temperature and level.

The information in this course outline is subject to revision.

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or Minnesota Relay Service at 800-627-3529 or by using your preferred relay service.

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