South Central College

MECA 2250 Mechatronics Systems Operations III

Course Outcome Summary

Course Information

Description This course will focus on advanced principals of Programmable Logic Controllers (PLC). The student will become familiar with interfacing input and output with automation motion control systems used in manufacturing. Introduction of PLC networking, Supervisory Control and Data Acquisition (SCADA), Proportional - Integral - Derivative (PID) Control and the use of Human Machine Interface (HMI) in a Control System. Troublshooting exercises, technical writing assignments and safety procedures will be implemented throughout the course. Prerequisites: MECA 2150: Mechatronics Systems Operations II.

Total Credits 3

Total Hours 64

Types of Instruction

Instruction Type	Credits/Hours
Lecture	
Lab	

Pre/Corequisites

MECA 2150 Mechatronics Systems Operations II

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Review Program Control Instructions

Learning Objectives

Discuss Control Background
Recognize Principles of Operation
Analyze Functions of Subroutines

Identify Immediate Input and Output Instructions Function

2. Design a Control System

Learning Objectives
Identify Safety Practices
Develop a Control System Incorporating a PLC, PID Device and HMI
Document Control System
Interpret Control System Results

3. Use Function Blocks

Learning Objectives
Explain Function Blocks
Develop Function Block Diagram
Demonstrate Function Block Programming

4. Explain SCADA Systems

Learning Objectives
Define SCADA systems
Demonstrate the Operation of a SCADA system
Explain the SCADA system on the FMS 200

5. Incorporate Open and Closed Loop Systems

Learning Objectives
Describe the Basic Operation of an Open-Loop System
Describe the Basic Operation of an Closed-Loop System
Demonstrate Set-Point Control

6. Identify System Approach to Troubleshooting the FMS 200

Learning Objectives
Identify System Components
Demonstrate Component Level Troubleshooting
Demonstrate System Approach to Troubleshooting

7. Interpret PID Systems

Learning Objectives
Discuss the Operation of PID Systems
USE PID Systems with a PLC
Outline the Functions of the Different Parts of a PID System

8. Define PLC Networking

Learning Objectives
Discuss How a Computer's Operating System is Designed to Function
Explain How a Work Cell Functions in regards to the FMS 200
Compare the Methods by Which Control Systems Communicate with Each Other

9. Explore Human Machine Interface (HMI) use in a Control System

Learning Objectives
Review the use of HMI systems
Program HMI
Integrate HMI into Control System

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

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