



South Central College

MECA 2240 Senior Project

Course Outcome Summary

Course Information

Description	The Senior Project at South Central College (SCC) is an opportunity for students to demonstrate what they know and to showcase their achievement. The project must be successfully completed as a component of the Mechatronics program, which is a required course for all graduating seniors. The Senior Project is a fitting conclusion to a student's education because through this endeavor, one is able to demonstrate accumulated skills in reasoning, research, problem solving, human interaction, organization, and public speaking. This course may also include an internship and will follow the SCC internship guidelines. This course may also be taken in variable increments of 1 to 5 credits. (Prerequisite: MECA 2150 - Mechatronics Systems Operations I or consent of Instructor).
Total Credits	5
Total Hours	240

Types of Instruction

Instruction Type	Credits/Hours
On-Off Campus Lab	1-5/48-240

Pre/Corequisites

MECA 2150 - Mechatronics Systems Operations I or consent of Instructor

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. Understand the need for work-space safety.

Learning Objectives

Review Lab Safety

Demonstrate Lab Safety

Explain Safety Systems

2. Explore design project parameters.

Learning Objectives

Review Project Budget
Apply Manufacturability
Analyze Problem Solving Activities
Demonstrate Engineering Methods During Design Process

3. Develop basic model.

Learning Objectives

Use 3D Modeling Features
Identify Drawing Parameters
Develop Concept Drawing
Create Finished Drawing

4. Integrate electronic circuit protection.

Learning Objectives

Demonstrate Circuit Essentials
Explain the Unit of Current, Unit of Voltage and the Unit of Resistance
Demonstrate the Use of Circuit Symbols and Diagrams

5. Operate electrical measurement meters.

Learning Objectives

Operate a Voltmeter
Use an Ammeter
Operate an Ohmmeter
Demonstrate the Safety Precautions When Using Electrical Meters

6. Identify electric motors.

Learning Objectives

Explain Motor Classifications
Describe Motor Enclosures
Incorporate Motors into Project Design

7. Utilize computer software.

Learning Objectives

Demonstrate ESD and Electrical Safety Practices
Use Office Suite Software
Incorporate Scheduling Software
Demonstrate the Use of DeviceNet, Ethernet or ModBus Communications

8. Utilize mechanical drives.

Learning Objectives

Use Belt Drives
Use Pulleys
Utilize Belt Tensioning Techniques

9. Use mechanical breaking.

Learning Objectives

Analyze Breaks
Select Breaking Type for Selected Project
Analyze Clutch Needs for Selected Project
Select Clutch Type

10. Incorporate mechanical maintenance.

Learning Objectives

Use Alignment Tools

Use Lubrication
Develop Maintenance Schedules
Maintain Maintenance Schedules

11. Incorporate linear bearings.

Learning Objectives

Identify Linear Bearings Types as They Pertain to Selected Project
Select Linear Bearings
Use Linear Bearings in Selected Project

12. Explain mechanical vibration.

Learning Objectives

Identify Unbalanced System
Explain Acceleration as it Pertains to Selected Project
Explain Velocity as it Pertains to Selected Project
Correct Unbalanced System

13. Identify input and output requirements.

Learning Objectives

Identify Open Collector Circuit
Identify Current Sourcing and Current Sinking
Calculate Input and Output Needs
Develop Schematic Circuit Drawings

14. Identify Programmable Logic Controller (PLC) guidelines.

Learning Objectives

Select Programmable Logic Controller (PLC)
Define PLC System Outcomes
Use PLC Instructions
Identify PLC Scan Rate

15. Implement Programming Language to PLC.

Learning Objectives

Document System Considerations
Use Contacts and Coils
Use Timers
Use Counters
Use Special Function Blocks

16. Validate project requirements.

Learning Objectives

Identify Project Validation
Demonstrate Validation Methods
Refine Project as Compared to Requirements
Document Project Validation Results

17. Construct project.

Learning Objectives

Explain Project Concept
Develop Project Plan
Gather Components from BOM

18. Keep project research journal.

Learning Objectives

Record Necessary Data Organized in a Notebook
Arrange Information in Logical Fashion
Assemble a Bill of Materials (BOM)

19. Present final model / project.

Learning Objectives

Describe Project Concept
Discuss Improvements and Gather Peer Feedback
Measure Success Based on Data versus Project Concept
Present Project Results

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

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.