South Central College

MECA 2240  Senior Project

Common Course Outline

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**
5.00

**Total Hours**
240.00

Types of Instruction

<table>
<thead>
<tr>
<th>Instruction Type</th>
<th>Credits/Hours</th>
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<tbody>
<tr>
<td>On-Off Campus Lab</td>
<td>1-5/48-240</td>
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Pre/Corequisites

Prerequisite  MECA 2150 - Mechatronics Systems Operations I or consent of Instructor

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 verses Project Concept
Present Project Results

**SCC Accessibility Statement**

If you have a disability and need accommodations to participate in the course activities, please contact your instructor as soon as possible. This information will be made available in an alternative format, such as Braille,
large print, or cassette tape, upon request. If you wish to contact the college ADA Coordinator, call that office at 507-389-7222.

Disabilities page http://southcentral.edu/academic-policies/disability-rights.html