MINNESOTA WEST COMMUNITY & TECHNICAL COLLEGE
COURSE OUTLINE

Faculty is required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. MECH COURSE NUMBER: 2125

NUMBER OF CREDITS: 3 credits (1 Lecture and 2 Lab)

COURSE TITLE: Motion Control

CATALOG DESCRIPTION:
Examines components in a motion control system, including servo systems, motors, feedback devices, controllers, and the software used to control precise motion in industrial automation.

AUDIENCE: Mechatronics students

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Area: by meeting the following competencies:
Area: by meeting the following competencies:
Area: by meeting the following competencies:

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:
MECH1125, MECH1135, MECH2136

LENGTH OF COURSE: Semester

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

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

1) ACADEMIC CONTENT: The academic objectives of this course are:

   The student will acquire the knowledge and skills needed to: design, wire, program, and troubleshoot motors, motor controls, servo systems, actuators, feedback devices, drives, controllers, and interfaces used in an automated environment.

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:

   a. Completing homework (reading, labs, and worksheets)
b. Participating in classroom discussions and activities
c. Taking open and closed book quizzes and tests
d. Design, wire, and troubleshoot automation circuits

3) COMMUNICATIONS SKILLS: This course will help students improve their oral
and written communication skills through:
a. Participating in class discussions and reports
b. Participating in assignments, worksheets, and reports

4) HUMAN DIVERSITY: This course will help students recognize, understand, and
appreciate human diversity through:
a. Participating in classroom discussions
b. Working with other students on research and lab activities
c. Working with students from other cultures

TOPICS TO BE COVERED:
1. AC and DC motors
2. Motor Controls
3. Motion control theory
4. Open/closed loop systems
5. Actuators
6. Feedback devices
7. Drive and Controller
8. Programming
9. Multi-axis coordinate systems
10. System setup and implementation
11. Troubleshooting principles and testing for hardware and software

COURSE LEARNING OUTCOMES (GENERAL):
1. Identify and understand motor and motion control components and applications.
2. Demonstrate the ability to design, wire, program, implement, and troubleshoot a
   complete servo application.

STUDENT LEARNING OUTCOMES (SPECIFIC):
1. Identify AC and DC motor construction and function
2. Design and wire motor control circuits
3. Identify various controller, drive, actuator, feedback, and interface hardware
   components, communication interfaces, and associated I/O field devices.
4. Retain knowledge of various motion control systems.
5. Identify various multi-axis coordinate systems
6. Demonstrate an understanding of the function and operation of servo controlled
   systems.
7. Demonstrate skills in designing, wiring, programming, troubleshooting, and
   operation of motion control systems.
LEARNING/TEACHING TECHNIQUES used in the course are:
- Collaborative Learning
- Student Presentations
- Creative Projects
- Lecture
- Demonstrations
- Lab
- Problem Solving
- Interactive Lectures
- Individual Coaching
- Films/Videos/Slides
- Other (describe below)

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

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.

The information in this course outline is subject to revision

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 via your preferred Telecommunications Relay Service.

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Revised 10/1/16