Western Technical College

10664105 Robotics Application

Course Outcome Summary

Course Information

Description	This course reinforces prior knowledge from previous robotics classes. An emphasis will be placed on Robot I/O, external I/O, and integrating the controller with other automation devices.
Career Cluster	Manufacturing
Instructional Level	Associate Degree Courses
Total Credits	2
Total Hours	54

Pre/Corequisites

Prerequisite

> 10620165 Robotic Maintenance

Textbooks

No textbook required.

High Impact Practices

1.   Industry Credential or Certificate: by the end of this course, you will develop the skills necessary to obtain an industry-recognized certificate or credential.

Course Competencies

1.   Jog the robot using available coordinate systems.

Assessment Strategies
1.1.   Skill Demonstration

Criteria

You will know you are successful when

1.1.   You differentiate between six-axis and Cartesian coordinate systems.
1.2.   You jog the robot using individual six-axis coordinates.
1.3.   You jog the robot using a Cartesian coordinate system.

Learning Objectives

1.a.   Investigate Cartesian and six-axis coordinate systems.
1.b.   Investigate custom user frame coordinate systems.
1.c.   Investigate tool coordinate systems.
1.d.   Display the robot motors' positions in pulse counts or position data.
1.e.   Use the axis keys to jog the robot at different manual speeds.
1.f.   Display the robot's tool center point position.

2.   Explore various recovery procedures.

Assessment Strategies

2.1.   Skill Demonstration

Criteria

You will know you are successful when

2.1.   You reset an error message.
2.2.   You reset a minor alarm.
2.3.   You display alarm history and details.
2.4.   You perform overrun and internal shock sensor recovery.
2.5.   You perform external shock sensor recovery.
2.6.   You confirm position for the specified home point.

Learning Objectives

2.a.   Cancel an error message.
2.b.   Reset an alarm.
2.c.   Access alarm history.
2.d.   Perform shock sensor recovery.

3.   Execute various project/task functions for robot motion.

Assessment Strategies

3.1.   Skill Demonstration

Criteria

You will know you are successful when

3.1.   You create, display and select a project/task.
3.2.   You create a new project/task, program steps, and verify playback with forward/reverse and interlock test start.
3.3.   You operate the robot in teach, manual and automatic modes.
3.4.   You delete, undelete, copy, and rename project/tasks.

Learning Objectives

3.a.   Create a new program.
3.b.   Display the active program.
3.c.   Select a program.
3.d.   Create a new program that contains six-axis and linear motions.
3.e.   Program with the last step of program in same position as the first.
3.f.   Perform path confirmation.
3.g.   Play the new program in various cycle settings.
3.h.   Display program list.
3.i.   Display the program header.
3.j.   Examine common program functions: copy, delete, undelete, rename.

4.   Examine Input and Output instructions.

Assessment Strategies

4.1.   Skill Demonstration

Criteria

You will know you are successful when

4.1.   You access the programming language I/O list.
4.2.   You monitor universal I/O.
4.3.   You execute program instructions.

Learning Objectives

4.a.   Simulate an Input.
4.b.   Force an individual output.
4.c.   Determine the binary value of 8-bits.
4.d.   View the output as the tool center point passes through the interference zone.
4.e.   Examine instructions needed to program outputs, waits, and inputs.
4.f.   Use the stored byte-value for a designated purpose.
4.g.   Program a wait instruction referencing the output for the interference zone.

5.   Examine control instructions.

Assessment Strategies

5.1.   Skill Demonstration

Criteria

You will know you are successful when

5.1.   You program call and return instructions within a project/job and monitor the parent and child programs.
5.2.   You program structured text instructions within a project/job.
5.3.   You program jump and jump label instructions within a project/task both with and without the use of conditional if instructions.

Learning Objectives

5.a.   Explore and program various subroutine and nested jobs.
5.b.   Monitor for the active program when using subroutines.
5.c.   Explore ways to program conditional and unconditional subroutines.
5.d.   Explore methods of calling or jumping to programs.
5.e.   Examine timer, pause, and comment instructions.
5.f.   Program using conditional statements.

6.   Integrate the robot with other automation devices.

Assessment Strategies

6.1.   Demonstration

Criteria

You will know you are successful when

6.1.   you establish communication between robot controller, HMI, and PLC.
6.2.   you execute various commands using signals from the PLC and HMI to the robot.
6.3.   you hardwire electromechanical components to the robot IO.
6.4.   you execute robot motions using external IO and hardwired components.

Learning Objectives

6.a.   Establish communication between robot controller, HMI, and PLC.
6.b.   Execute various commands using signals from the PLC and HMI to the robot.
6.c.   Hardwire electromechanical components to the robot IO.
6.d.   Execute robot motions using external IO and hardwired components.