Northwest State Community College  
Course Information Sheet

# Course Information

Title: Servo/Robotics A

Course Number: PLC135

Credit Hours: 1

Pre-requisite: PLC134

# Description

Servo/Robotics Systems is an introductory course in Industrial Robotics with emphasis on the Fanuc R-J30iA series robot controller. The course is intended for students who wish to gain insight into robot operations in order to program, test, run, and trouble-shoot FANUC material handling application programs. Students successfully completing the course will be able to: safely demonstrate power up and jog the robot, execute production operations and recover from common faults, create and modify material handling programs and macros, and utilize robot and controller input and output signals. Obtaining a FANUC CERT certificate is possible.

# Learning Outcomes

Upon completion of this course the students will be able to:

1. Describe the hardware and operation of a Fanuc robot system
2. Implement safety regulations when working with robotic systems

# Required Material

**Text:**

Handling Tool Operations & Programming Student Manual, FANUC America Corporation, Revision F.

**Supplies:**

# Module 1: Safety, Power-up & Jogging a Fanuc Robotics System

This module focuses on the Handling Tool Application, Jog in Joint, Power up and JOG in JOINT Coordinate. Includes identifying Robot specifications, set axis limits, and JOG robot in World Coordinate.

Upon completion of this module the student will be able to:

1. Indicate which axis (J1-J6) on the Fanuc robot are considered the major axis.
2. Explain what the acronym “SOP” stands for when working with Fanuc systems.
3. List the “Priority for Safety” (machinery, people, devices) in the order of importance based on industry safety standards.
4. List the major components of a Fanuc robotic system.
5. Identify what device on a Fanuc robotic system senses speed and positional information.
6. List the various Safety Enhancing Devices (which will disable a robot).
7. Explain the Dual Check Safety (DCS) safety feature found in the Fanuc robotic system.

### Module 1 Activites

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 Read Basic Robot Operations

Fanuc Basic Robot Operations

 Watch Video: CERT+Operations+1 safety and cycle power (22:26)

<https://www.youtube.com/watch?v=BAHaOGseKJ8>

 Watch Video: CERT+Operations+1+Quiz (1:18)

<https://www.youtube.com/watch?v=K1-y6IW2vq0>

 Watch Video: Fanuc Teach Pendant Overview (7:06)

<https://www.youtube.com/watch?v=JiLttu0cEW0>

 Watch Video: Fanuc Jogging in Joint (3:24)

<https://www.youtube.com/watch?v=4cJxEerA3x8>

 Watch Video: Jogging in World (2:32)

<https://www.youtube.com/watch?v=6GUbMKWBtio>

 Watch Video: Quick and Full Menus (1:56)

<https://www.youtube.com/watch?v=oRbsdkWxtHk>

 Watch Video: CERT+Operations+2 moving in joint and world (28:30)

<https://www.youtube.com/watch?v=saPMyMVQ6ig>

 Watch Video: CERT+Operations2+Quiz (0:50)

<https://www.youtube.com/watch?v=MZHj11E4fSQ>

 Watch Video: FANUC LR Mate 200iC joint demo (0:57)

<https://www.youtube.com/watch?v=64UAyw-wtNg>

 Watch Video: FANUC - DUAL CHECK SAFETY (DCS) (6:03)

<https://www.youtube.com/watch?v=hHVyPfHIwSA>

 Complete Quiz 135-1

See Quiz PLC135-2 Content Packaging files to upload into an LMS System

 Review Hands-on Lab 135-1.1

See Lab Documents

 Schedule and complete Hands-on Lab 135-1.1

See PLC135 1.1 Lab Document

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# Module 2: Fanuc Robots: Basic Motion Programming & Testing

In Module 2, we will focus on working with the Handling Tool Application to create a motion lab. It also covers singularity and how to test and run a program, including single step and continuous testing.

Upon completion of this module the student will be able to:

1. Explain how to activate the software limits of the Fanuc when they are changed.
2. Identify what key on the robot teach pendant clears a fault condition.
3. Explain what position the mode selection switch on the SOP must be when the robot is running in a production process.
4. Explain how to navigate to the list of programs in the Fanuc controller using the teach pendant.
5. Explain what position the mode selection switch on the SOP must be in order to single step the robot through a program.
6. Explain how to navigate to the screen on the teach pendant, to change to another program.
7. Explain what the term “Singularity” means when working on a robotic system.

### Module 2 Activities

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 Read Intro to Programming, Motion Instructions, and File Backup

Fanuc Basic Robot Operations

 Watch Video: CERT+Operations+3 create and change TP programs (21:25)

<https://www.youtube.com/watch?v=zWZyu8-bD4w>

 Watch Video: CERT+Operations+3+Quiz (1:31)

<https://www.youtube.com/watch?v=SLXqMU0yo2M>

 Watch Video: Setting Software Travel Limits (4:23)

<https://www.youtube.com/watch?v=sccSIndwSEs>

 Watch Video: Software Version Identification (1:23)

<https://www.youtube.com/watch?v=B3PLvGY6hL4>

 Complete Quiz 135-2

See Quiz PLC135-2 Content Packaging files to upload into an LMS System

 Review Hands-on Lab 135-2.1

See Lab Documents

 Schedule and complete Hands-on Lab 135-2.1

See PLC135 2.1 Lab Document

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