Advanced Robotic Programming with the Yaskawa YRC-Series Controllers

COURSE OUTLINE

Catalogue Number	5006-0000
Category	Robotics
Duration	15 Hours
Additional Content with Hardware Package	10 Hours
Prerequisite Course	Fundamentals of Robotics

Note: *Activities written in italics require hardware. See the Course Materials document and the individual lab activity documents for details.*

Activity 1: Onwards and Upwards

Review of Basic Robotic Programming

Review of RoboCell

A Look Back at Your Robotic System

Safety Considerations

Activity 2: Programming with Subroutines

Subroutines

Task: Running RoboCell and Recording Positions

Subroutine Commands

Task: Programming with Subroutines

Task: Running and Evaluating the Program

Task: Changing the Order in Which Subroutines are Run

Lab Activity A: Connecting Peripheral Devices

Activity 3: Digital Inputs

- Inputs and Outputs
- Manually Switching Digital Inputs
- Jump To Command
- Programming with Labels and Unconditional Jumps
- Conditional Jump Command
- Task: Programming with Inputs and Conditional Jumps

Activity 4: Digital Outputs

- Inputs and Outputs
- Experiment Table
- Task: Sending Output Signals Manually
- Task: Programming with Output Signals
- Task: Producing Output Signals During a Robot Operation

Lab Activity B: Inputs and Outputs

Activity 5: Extending the Envelope

- Robot Work Envelope
- The Rotary Table
- Using a Rotary Table to Stack Cylinders
- Implementing a Sensor
- Other Peripheral Devices

Activity 6: The Linear Slidebase

- Introducing the Linear Slidebase
- Controlling the Slidebase
- Recording Peripheral Positions
- Task: Moving a Robot Along a Slidebase
- Task: Recording Positions for the Robot on a Slidebase
- Task: Programming with the Slidebase

Activity 7: Delivering Materials with a Conveyor Project

- Conveyors in Robotic Workcells
- Polling
- Delivering Materials with a Conveyor
- Stop Conveyor and Start Conveyor Commands
- Task: Announcing the Arrival of an Object on the Conveyor
- Task: Teaching Positions and Programming
- Task: Running and Evaluating the Program

Activity 8: Conditional Branching

- Review of Inputs and Outputs
- Conditional Branching
- Task: Recording Positions for a Sorting Program
- Task: Programming a Sorting Task
- Task: Running and Evaluating the Sorting Program

Lab Activity C: Conditions

Motoman Mini-Activity: Teaching Conditions

- Special Play Settings
- Teach Condition Settings
- Quiz

Activity 9: The Interrupt Function

- Review of Conditional Branching
- Storing Equipment Using the If Input Command
- Sampling Inputs
- On Input Interrupt # On Jump Command
- Task: Running RoboCell and Recording Positions
- Task: Programming
- Task: Running and Evaluating the Program

Activity 10: Loops and Counters

- Jumps
- The Set Variable
- Task: Using a Variable Value to Program Conditional Jumps
- Using a Conditional Loop
- Task: Using a Conditional Loop
- Task: Using Controller Inputs in a Conditional Loop
- Programming Challenge: Combining Conditions

Lab Activity D: Counting Blocks

Lab Activity E: Shifting

Activity 11: Programming a Sorting System Project

- Sorting Blocks from a Conveyor
- Gripper Sensor
- Task: Recording Positions
- Task: Programming the Variables
- Task: Writing the Program
- Task: Running the Program

Lab Activity F: Advanced Tool Settings

Lab Project I: Background Task

Lab Project II: Catch & Dip

Lab Project III: Double Tool