

Advanced Robotic Programming with the MHJF

COURSE OUTLINE

Catalogue Number	77-5002-0000
Category	Robotics
Duration	15 Hours
Additional Content with Hardware Package	10 Hours
Prerequisite Course	Fundamentals of Robotics with the MHJF

i **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 the MHJF
- 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