Robotics and Materials Handling 1 with SCORBOT-ER4u

Catalogue Number	77-8082-0000
Category	Robotics
Duration	15 Hours

Activity 1: Introduction to Robotics

- What is a Robot?
- History of the Industrial Robot
- Robotic System Components
- Flexible Manufacturing Systems
- Robotics and Materials Handling Lab Station
- Safety
- Controller Components

Activity 2: Using Robotic Control Software

- SCORBASE Control Software
- SCORBASE Window Components
- Teach Pendant
- Homing
- SCORBOT Self-Protection
- Emergency Stops
- Speed and Resolution
- Installing the Software for this Module
- Manipulating the Robot
- Task: Inventory and Safety Checks
- Task: Homing the Robot
- Task: Robot Working Limits
- Task: Setting the Speed

Activity 3: Recording Robot Positions

- Joint Coordinate System
- Recording Absolute Positions
- Task: Inventory and Safety Checks
- Task: Recording Positions
- Task: Viewing the Positions Database
- Task: Saving the Positions and Exiting SCORBASE
- Task: Activating SCORBASE and Loading Recorded Positions
- Task: Moving the Robot to Recorded Positions

Activity 4: Writing and Running a Robot Program

- Moving a Cube by Recording Four Positions
- Task: Inventory and Safety Checks
- Task: Recording Positions for Moving the Cube
- Task: Saving the Project
- Programming Tools
- Task: Writing a Robot Program
- Running a Program
- Task: Running the Program
- Aborting a Program
- Task: Aborting the Program
- Editing a Program
- The Wait Command
- Task: Using the Wait Command in the Program

Activity 5: Cartesian Coordinates

- Robotic Control Systems
- Pick and Place Task
- Cartesian Coordinate System
- Using Cartesian Coordinates
- Task: Inventory and Safety Checks
- Task: Teaching Positions
- Task: Testing and Running the Program

Activity 6: Inputs and Program Jumps

- Inputs and Outputs
- Jump To and Label Commands
- Experiment Table
- Task: Inventory and Safety Checks
- Task: Programming with Labels and Unconditional Jumps
- Task: Running a Program with Labels
- Programming with Unconditional Jumps
- Conditional Jump Command
- Task: Programming with Inputs and Conditional Jumps
- Task: Running the Program
- Task: Using Input Signals to Control a Robot Operation
- Task: Running the Program

Activity 7: Outputs

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

Activity 8: Joint and XYZ Coordinate Systems

- Linear Movement
- Task: Inventory and Safety Checks
- Task: Manipulating the Robot in the XYZ Coordinate System
- Task: Displaying Position Coordinates
- Rows and Columns, Joint and XYZ Modes
- Task: Teaching Absolute XYZ Positions
- Task: Teaching Positions for a Robotic Application
- Task: Executing Linear Movements
- Task: Writing a Program with Linear Movements

Activity 9: Relative Positions

- Absolute and Relative Positions
- Pick and Place Using Relative XYZ Coordinates
- Task: Inventory and Safety Checks
- Task: Teaching Relative XYZ Positions
- Task: Programming a Pick and Place Task
- Task: Changing the Reference Position
- Position Numbering
- Task: Using Relative Positions to Stack Materials

Activity 10: Loops, Polling, and Counters

- Jumps
- The Set Variable
- Task: Inventory and Safety Checks
- Task: Using a Variable Value to Program Conditional Jumps
- Stacking Materials Using a Conditional Loop
- Task: Stacking Materials Using a Conditional Loop
- Task: Programming Challenge

Activity 11: Subroutines

- Task: Inventory and Safety Checks
- Subroutines
- Task: Programming Subroutines
- Remarks
- Task: Adding Remarks and Beeps to the Program

Activity 12: Contact and Non-Contact Sensors

- The Robotic Cell
- Task: Inventory and Safety Checks
- Task: Activating the Photoelectric Sensor
- Task: Programming a Task Using the Proximity Sensor
- Task: Recording Robot Positions at the Parts Feeder and Bin
- Task: Transporting Material from Feeder to Bin

Activity 13: Servo Control of the Conveyor

- Conveyors in Robotic Workcells
- Conveyor Positions
- Stop Conveyor and Start Conveyor Commands
- Task: Inventory and Safety Checks
- Task: Manually Moving the Conveyor
- Task: Recording Absolute Conveyor Positions
- Task: Programming a Robot Pickup from the Conveyor

Activity 14: I/O Control of the Conveyor

- Encoders
- Polling
- Task: Inventory and Safety Checks
- Task: Viewing Encoder Counts
- Task: Announcing the Arrival of a Workpiece on the Conveyor
- Task: Recording Robot Positions for Tending the Conveyor
- Task: Programming the Robot Pickup upon Sensor Input

Activity 15: Conclusion

- Task: Final Project

Comprehensive Post-Test