Fundamentals of Robotics for SCORBOT-ER 4u

Catalogue Number	3046-0000
Category	Robotics
Duration	15 Hours

Activity 1: Introduction to Robotics

What is a Robot?

History of the Industrial Robot

Applications of Industrial Robots

Flexible Manufacturing Systems

Activity 2: How Robots Work

Robotic System Components

Types of Robot Joints

Types of Robots

Manipulator Driving Axes

Robotic Control Systems

Programming Language: RoboCell Robotic Software

Activity 3: Using Robotic Control Software

Simulation Software

Task: Running RoboCell and Opening a Project

RoboCell Window Components

RoboCell Working Modes

Task: Selecting Working Modes

3D Image Window

Task: Adjusting the View of the Robot Workcell

Running Programs

Task: Running a Sample Program

Manipulating the Robot

Task: Robot Working Limits

Activity 4: Recording Robot Positions

- Homing
- Task: Running RoboCell and Opening a Project
- Recording Absolute Positions
- Task: Recording Positions
- Moving the Robot
- Task: Executing Movements
- Joint Coordinate System
- Cartesian Coordinate System
- Manual Movement Dialog Box
- Task: Manipulating the Robot in the XYZ Coordinate System

Activity 5: Programming a Simple Pick and Place Task

- Record and Teach Commands
- Task: Running RoboCell and Opening a Project
- Moving a Cube by Recording Four Positions
- Task: Recording and Teaching Positions
- Programming Tools
- Task: Writing a Simple Robot Program
- Task: Saving a Robot Project
- Task: Running a Robot Program

Activity 6: Absolute and Relative Postions

- Absolute and Relative Positions
- Using Relative Positions
- Send Robot to Object
- Task: Recording Relative Positions
- RoboCell Copy and Paste Functions
- Task: Programming
- Task: Running the Program
- Task: Independent Programming

Activity 7: Basic Robotic Programming Tools

- RoboCell Program Structure
- Object Inspection Task
- Task: Recording Positions
- Task: Programming
- The Remark
- Task: Adding Remarks to a Program
- Debugging Commands
- Task: Adding Debugging Tools and Delays to a Program
- Making Commands Non-executable
- Task: Making Ring Bell Commands Non-executable

Activity 8: Block Alignment Project

- Aligning a Block
- Task: Recording Positions
- Task: Programming
- Task: Running and Evaluating the Program
- Task: Programming a Continuous Cycle

Activity 9: Feeders and Templates

- Feeder
- Template
- Using a Feeder and Template in a Production Process
- Task: Running RoboCell
- Task: Recording Positions
- Turning Outputs On and Off
- Task: Programming and Running the Program
- Task: Using a Template to Move Parts in a Workcell

Activity 10: Peripheral Devices

- Robot Work Envelope
- Task: Determining a Robot's Work Envelope
- Rotary Table
- Using a Rotary Table to Stack Cylinders
- Task: Recording Robot Positions
- Task: Recording Positions for Peripheral Devices
- Task: Programming and Running a Stacking Operation
- Task: Making a Program More Efficient

Activity 11: Linear Slidebase Project

- Linear Slidebase Project
- Recording Positions for the Robot and Peripheral Devices
- Task: Moving a Robot Along a Slidebase
- Task: Recording Positions for the Robot and Peripheral Devices
- Task: Programming
- Task: Running and Evaluating the Program
- Task: Optimizing a Program

Activity 12: Encoders

- Encoders
- Recording and Storing Positions Using Encoder Values
- Using Encoder Values to Record Positions
- Task: Programming with Encoder Values
- Task: Running and Evaluating the Program
- Task: Independent Programming

Activity 13: Roll and Pitch

- Degrees of Freedom
- Task: Running RoboCell and Loading the Project
- Adjusting the Roll
- Task: Modifying Positions #13 and #23
- Task: Modifying Position #2 by Manipulating the Roll
- Task: Running the Program

Activity 14: Programming the Robot to Execute Linear Movements

- Robot Machine Operators
- Task: Recording Two End Positions and Running the Program
- Controlling the Robot Trajectory
- Task: Recording a Middle Position
- Task: Recording a Relative Position
- Linear Movement
- Task: Observing the Effects of the Go Linear Command
- Task: Observing the Encoder Values for a Linear Trajectory
- Conclusion

Activity 15: Programming the Robot to Execute Circular Movements

- Controlling the Robot Trajectory
- Using the Go Linear to Position and Go Circular to Position
- Task: Recording Positions to Write the Letter B
- Task: Programming the Robot to Write the Letter B
- Task: Running the Program
- Task: Programming the Robot to Write the Number 3

Activity 16: Final Project: Drawing a House

- Drawing a House
- Task: Recording Positions
- Task: Programming the Robot to Draw a House
- Task: Running and Evaluating the Program
- Challenge
- Task: Programming and Running the Challenge