

Automation and Robotics | One Year Program: Scope & Sequence

Semester 1

Automation and Robotics I (90 days)

Semester 1: Foundations of Automation, Robotics, and Systems (225 Hours)

1. Fundamentals of Industry 4.0 and Mechatronics (40 Hours)

- Introduction to Industry 4.0 principles.
- Overview of sensors and smart sensors and their applications in automation.

○ 1.0 EXAMINE THE IMPACT OF NEW TECHNOLOGIES ON AUTOMATION AND ROBOTICS

○ 9.0 EXAMINE DATA COMMUNICATION METHODOLOGIES

Certifications- NC3 Festo Fundamentals of I4.0 &

Introduction to Mechatronics

*District Pre-Assessment

2. Fundamentals of Robotics and Automation (40 Hours)

- Basics of robotic systems, including design, operation, and applications.
- Overview of automation technologies impacting business and manufacturing.

○ 1.0 EXAMINE THE IMPACT OF NEW TECHNOLOGIES ON AUTOMATION AND ROBOTICS

○ 8.0 IDENTIFY INDUSTRIAL ROBOT TYPES AND THE TASKS THEY PERFORM

Certifications- Universal Robots EDU Certification & NC3

Festo Robotics (Level 1)

3. Basics of Electrical Systems in Automation (45 Hours)

- Fundamentals of electricity (AC/DC).
- Introduction to measuring and troubleshooting electrical circuits.

○ 2.0 PERFORM ELECTRICAL AND ELECTRONIC TASKS

○ 5.0 DESCRIBE THE OPERATION AND USE OF VARIOUS FORMS OR ELECTRICAL MOTORS

○ 13.0 DEMONSTRATES SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Certifications- NC3 Festo STEM Electronics & Fundamentals of Electricity- AC & DC (Level 1)

OSHA 10

5. PLCs & Sensor Technology and Applications (50 Hours)

- Sensor technologies in automation.
- Application of sensors in various industry scenarios.

○ 4.0 ANALYZE PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS

○ 10.0 APPLY SENSOR SOLUTIONS

○ 13.0 DEMONSTRATES SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Certifications- NC3 Festo STEM PLC & Fundamentals of Sensor Technology (Level 1)

*Semester Exam

Semester 2

Automation and Robotics II (90 days)

Semester 2: Advanced Applications and Specialized Skills (225 Hours)

1. Fundamentals of PLCs and Controls (50 hours)

- Basic PLC functionality and applications.
- Introduction to ladder logic and simple control systems.

○ 10.0 APPLY SENSOR SOLUTIONS

○ 13.0 DEMONSTRATES SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

2. Smart Sensor Technology and Applications (50 Hours)

- Advanced sensor technologies in automation.
- Application of sensors in various industrial scenarios.

○ 10.0 APPLY SENSOR SOLUTIONS

○ 13.0 DEMONSTRATES SAFE AND PROPER USE OF ELECTRONIC AND OTHER LABORATORY EQUIPMENT, TOOLS, AND MATERIALS

Certifications- NC3 Festo Fundamentals of PLCs & Applied Principles of Smart Sensors

3. Applied Robotics and Advanced Automation (55 hours)

- Advanced robotic applications, including programming and AI integration.
- Case studies in robotics in manufacturing, healthcare, and services.

○ 8.0 IDENTIFY INDUSTRIAL ROBOT TYPES AND THE TASKS THEY PERFORM

○ 9.0 EXAMINE DATA COMMUNICATIONS METHODOLOGIES

○ 12.0 DEVELOP ROBOTICS APPLICATION SYSTEMS

Certifications- NC3 Festo Robotics (Level 2)

Semester Exam