

**Course Information Sheet**

Course Name: Robotics I

Instructional Material: Goodheart-Willcox Company-Industrial Robotics Fundamentals: Theory and Applications, 3rd Ed.

First Semester:

Week	Topic
1	Introduction to Robotics: History, Definition, and Applications
2	Safety: Industrial Robotics Safety and Safe Work Practices
3	Robot Anatomy: Robot Manipulators, Axes, and Configurations
4	Work Envelopes: Understanding and Differentiating Robot Workspaces
5	End-of-Arm Tooling (EOAT): Grippers and Application-Specific Tools
6	Robot Drives & Actuators: Electric, Hydraulic, and Pneumatic Systems
7	Robot Control Systems: Controllers, Teach Pendants, and HMIs
8	Sensors in Robotics: Proximity, Vision, and Force Sensors
9	Basic Programming: Introduction to Robot Programming Languages
10	Programming Concepts: Motion Control, PTP, and Continuous Path
11	Sequencing & Logic: Creating Sequential Programs with Logic
12	Kinematics: Understanding Robot Movement and Kinematic Equations
13	Robot Maintenance: Preventive Maintenance and Troubleshooting
14	Robot Applications: Pick-and-Place and Assembly Operations
15	Robot Applications: Palletizing and Material Handling
16	Robot Applications: Welding and Painting
17	Practical Project: Applying Programming to a Small-Scale Robot Task
18	First Semester Review & Final

**Second Semester:**

Week	Topic
19	Advanced Programming: Subroutines and Program Jumps
20	Advanced Programming: Using Input/Output (I/O) Signals
21	Robotics and PLCs: Introduction to Programmable Logic Controllers
22	Interfacing: Connecting Robots to External Devices
23	Robot Calibration: Methods for Calibrating Robot Tools and Frames
24	Robot Vision Systems: Principles and Applications
25	Mobile Robotics: Introduction to Autonomous Mobile Robots (AMRs)
26	Collaborative Robots (Cobots): Safety and Human-Robot Interaction
27	Safety Systems: E-stops, Light Curtains, and Safety Fences
28	Ethical & Social Implications: Robots in the Workplace and Society
29	Robotics Careers: Exploration of Fields and Job Opportunities
30	Final Project: Planning and Design Phase
31	Final Project: Building and Programming
32	Final Project: Testing and Optimization
33	Final Project: Troubleshooting and Documentation
34	Robotics Competition: Applying Skills in a Competitive Setting
35	Final Presentation: Demonstrating the Final Project
36	Course Wrap-up & Final Exam