UTAH SYSTEM OF HIGHER EDUCATION

Utah System of Higher Education
Robotics Technology
FY2027 / 21 Credits (630 Clock-Hours)

Foundational Courses

TEAM 1010 Essential Skills and Safety — 3 Credits / 90 Clock-Hours

The Essential Skills and Safety course teaches the basic concepts and terminology used in automation technology. Students gain proficiency through applying concepts of fasteners, measurement equipment, tolerances, and hand and power tool operations. The course covers safety and workplace skills as well as school and shop specific operations, standards, and procedures.

Objectives:
- Demonstrate a working knowledge of general safety practices and procedures.
- Demonstrate a working knowledge of hand, power, and measurement tools.
- Demonstrate a working knowledge of hardware and fasteners.
- Apply working knowledge of workplace skills.
- Review school specific orientation, standards, and procedures.

TEAM 1050 Electrical Systems — 2 Credits / 60 Clock-Hours

The Electrical Systems course teaches students to troubleshoot most electrical circuits they encounter in everyday life. Our world runs on electrical power and is fundamental to all work being done in automation. Students in this course gain relevant working knowledge in both AC & DC electrical systems. Competencies include basic electrical circuit design, analysis, troubleshooting, instrumentation, schematic and component identification, physics of electricity and applicable math.

Objectives:
- Demonstrate a working knowledge of safety practices and procedures of basic electrical systems.
- Operate, install, maintain electrical systems, tools, and devices.
- Read, utilize, and design electrical systems schematics.
- Apply principles and applications of electrical AC and DC systems.
- Apply systems diagnostics and troubleshooting of electrical circuits.

TEAM 1205 Robotics Fundamentals — 4 Credits / 120 Clock-Hours

The Robotics Fundamentals course is an introduction to robotics and applications for industrial robotics or autonomous machines. The technical aspects of industrial robotics are covered; principles of robotics; power supplies, movement systems; sensing, tooling, control systems and maintenance. The course includes safety, industrial applications, end effectors, and vision.

Objectives:
- Demonstrate safety practices and procedures of pneumatic systems.
- Identify and classify robots and classifications of industrial robots.
- Explain and list parts of the robot and degree of freedom.
- Explain fundamentals of robot programming.
- Describe and explain power supplies and movement systems.
- Explain and identify transducers used in automated systems.
- Explain and identify key fundamentals of robotics control systems and maintenance.

TEAM 1210 Introduction to Robotics — 4 Credits / 120 Clock-Hours

The Introduction to Robotics course covers use an industry 4-axis robotic system, creation of programs for various industry applications, vision and various end of arm tooling.

Objectives:
• Perform setup of required software/hardware and communication interface connections.
• Verify the installation.
• Perform programming, teaching, and playback, using blocky, graphic programming, and script control.
• Use the robotics system (software/hardware) for industry applications.
• Setup and use various end-effectors, for pick and place, 3D printing, laser engraving, writing/ drawing, vision, and linear rail system.
• Describes the workspace, principle, size, and technical specifications of the robot system.
• Identify and apply the coordinate systems.
• Apply motion modes to include jogging, point to point (PTP), ARC.

TEAM 1220 Robot Handling Tools — 4 Credits / 120 Clock-Hours

The Robot Handling Tools course covers the programming, setup, and troubleshooting of a 6-axis industrial robotics handling tool system as applied to industry applications.

Objectives:
• Apply safety precautions to robotic systems and work-cells.
• Identify robot systems and its components.
• Apply and identify the coordinate systems.
• Use the teach pendant to operate, test, program, and troubleshoot robotic systems.
• Power up, jog, and perform initial setup for robots.
• Utilize teach frames, and frame types applied to robots.
• Perform error and fault recovery procedures for robots, and backup and restore individual programs and files.
• Create motion program instructions to control robotic position, direction, and function.
• Create, modify, and execute a material handling program.
• Create and execute MACROs.
• Monitor, configure, force, and simulate input and output signals.

TEAM 1230 Robotics Vision — 4 Credits / 120 Clock-Hours

The Robotics Vision course covers the usage of a vision system to support robotics handling tool operations for various industry applications. This course uses and requires skills mastered from the Robot Handling Tools course.

Objectives:
• Apply safety practices and standards to robot installations, operation, and applications.
• Identify the components of a vision system.
• Install vision hardware, setup and calibrate a camera.
• Perform basic tasks and procedures to setup, teach, test, and modify robot vision program applications.
• Perform an inspection process with a vision system.
• Apply basic vision concepts and lighting.
• Perform the mastering of a robot using vision mastering procedures.
• Create tool frames for the robot applicator, using the vision system.
• Set up a 2-D single-view vision process.