STRANDS AND STANDARDS
ROBOTICS TECHNOLOGY

Course Description

An introductory course focused on robotic technologies and what it means to be living in an automated world. Students will gain an understanding of how robotic technologies impact the environment, society, and the economy. Students will develop a foundation in essential abilities and attitudes in connection with math and science skills that will in turn expand their opportunities in the world of automation.

Core Code	38.03.00.00.040
Concurrent Enrollment Core Code	None
Units of Credit	0.5
Intended Grade Level	8-9
Prerequisite	None
Skill Certification Test Number	None
Test Weight	None
License Area of Concentration	Secondary
Required Endorsement(s)	Technology & Engineering, or
	Technology

STRAND 1

Students will follow safety practices.

Standard 1

Identify potential safety hazards and follow general laboratory safety practices.

- Assess workplace conditions regarding safety and health.
- Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
- Locate and understand the use of shop safety equipment.
- Select appropriate personal protective equipment.

Standard 2

Use safe work practices.

- Use personal protective equipment according to manufacturer rules and regulations.
- Follow correct procedures when using any hand or power tools.
- Ref: https://schools.utah.gov/file/4de1dd59-0425-4f76-9e33-fdcf5de45dbf

Standard 3

Complete a basic safety test without errors (100%) before using any tools or shop equipment.

STRAND 2

Students will be introduced the history, environmental, societal and economic impacts of robotics and mechatronics.

Standard 1

Analyze the historical impacts of robotics technology and compare them with contemporary applications.
For example:

- Analyze the key elements that led to the invention of the modern robot.
- Define robotics and mechatronics.
- Discuss the future of robotics and mechatronics.

Standard 2

Discuss the political and societal impacts of robotics.
For example:

- Understand how the use of robots and drones affects society.
- Explore the use of robots in industry and their effect on the economy.

Standard 3

Explore different types of robots and mechatronics systems.
For example:

- Automated Guided Vehicle (AGV)
- CNC machines
- Industrial robots
- Domestic robots

STRAND 3

Students will be introduced to the hardware used to create Robots and other Mechatronics systems.

Standard 1

Students will be introduced to the basic electronics and control systems used to create robots and other mechatronic systems.
For example:
- Inputs
- Outputs
- Processors
- Electronic components

Standard 2

Students will be introduced to the mechanical components available for use in robots and other mechatronic systems.
For example:
- Structural components
- Hydraulic systems
- Pneumatic systems

STRAND 4

Students will be introduced to software design, coding structures, and software development.

Standard 1

Explore the concepts of computational thinking, the software design process, programming structures, and programming languages.
- Understand the concepts in computational thinking.
    - Decomposition, algorithms, binary, etc.
- Understand and use the software design process
    - Input, processing, output.
    - User interface design (UI)
    - User experience (UX)
- Understand and use programming structures.
    - Sequence programming
    - Decisions with if – then – else statements
    - Loops – repeat, for, while, etc.
    - Functions, modules, methods
    - Variables
- Understand and explore different programming languages.
    - Block type languages
    - Text based languages

STRAND 5

Students will use a design process to create a computer program for a robot to perform a physical task.

Standard 1

Work in teams in a collaborative environment.

Standard 2

Use a design process and document the work.
For example:
1. Identify & define the problem (criteria & constraints).
2. Brainstorm solutions.
3. Create a model (predictive analysis) & build a prototype.
4. Test the prototype (gather data).
5. Iteration (redesign & optimize).

Standard 3

Code the program using an appropriate programming environment and debug the program as needed.

Standard 4

Successfully operate the robot with the program or application that is developed.

STRAND 6

Students will investigate career opportunities in robotics and the automated manufacturing industry.

Standard 1

Identify available courses to complete the Engineering pathway with an emphasis in Robotics.
- Career Pathway: Engineering
- Ref: https://schools.utah.gov/file/4de1dd59-0425-4f76-9e33-fdcf5de45dbf (scroll down to page 23)

Standard 2

Identify occupations related to the robotics and automated manufacturing.
For example:
- Mechatronics
- Electrical Engineering
- Mechanical Engineering
- Computer Science
- Industrial Maintenance
- Manufacturing Engineering

Standard 3

Identify different types of opportunities to pursue training in Robotics and Automation.

For example:

- Apprenticeship
- Technical School
- College & University