*Unit 7 Mechanical Robotic Systems

Content Area: **Technology**
Course(s): **Robotics**
Time Period: **March**
Length: **16 blocks**
Status: **Published**

Transfer Skills

The design and creation of mechanical systems controlled through a programmable integrated circuit requires the understanding of structural and mechanical systems, as well as the capabilities and limitations of the components used.

Enduring Understandings

1. Mechantronics involves integrating many different areas of engineering into a single project.

2. Many mechanical systems require structures to be built that can withstand the mechanical force exerted by the system.

3. Mechanisms lose efficiency through friction.

4. The design of electronically controlled mechanical devices requires special care take to ensure all systems function together.

5. Computer programs should be created and written so they are tailored specifically for the electrical, mechanical and structural capabilities/limitations of the physical robot.

Essential Questions

1. Why is knowledge of many different types of engineering important in mechatronics projects?

2. How do forces affect mechanical systems?

3. What makes a mechanical system efficient?

4. What can be done to ensure that all systems in a mechantronics project interact as they are intended to be?

Content

text-based code, block-based code, variable, integer, Boolean logic, AND, NOR, XOR, NAND, OR, floating decimal point, string, declaration, counter, if-then, if-else, while loop, function, servo motor, electrical motor, motor encoder

Skills

1. Generate brainstorming ideas for a mechanical system.

2. Develop possible solutions for a mechanical system that accounts for forces exerted on its parts.

3. Design an electrical system that can control mechanical parts.

4. Develop and write a computer program and can control mechanical parts.

Resources

Desktop computers

Line-based programming software

Programmable integrated circuit (PIC) compatible with programming software

PIC peripherals

PIC sensors

PIC outputs

Standards

TECH.8.2.12.C.4	Explain and identify interdependent systems and their functions.
TECH.8.2.12.C.CS1	The attributes of design.
TECH.8.2.12.C.CS2	The application of engineering design.
TECH.8.2.12.D.CS1	Apply the design process.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic functions, website designs, applications, and games).
TECH.8.2.12.E.4	Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).
TECH.8.2.12.E.CS1	Computational thinking and computer programming as tools used in design and engineering.