

Robotics 3 - Unit 2

Content Area: **Generic Content Area**
Course(s): **Engineering Robotics 3**
Time Period: **Semester 1**
Length: **5 weeks**
Status: **Published**

Unit Introduction

This advanced unit will focus on students' fabrication and assembly skills. Students will utilize 2D and 3D designs with existing and new machining processes to recreate them in a real world shop environment. Students will also work on replacing existing framing structures and materials with new and improved units utilizing less material, stronger material, and incorporating less hardware. Designs will be tested in virtual environments using CFD techniques and then tested against real results. Students will also improve upon their animation of movement and rendering within Fusion 360. This unit will culminate in a robotic Haunted House.

Standards

TECH.8.1.12.D.5	Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs.
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
TECH.8.2.12.C.CS3	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.
TECH.8.2.12.D.1	Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.
TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
TECH.8.2.12.E.1	Demonstrate an understanding of the problem-solving capacity of computers in our world.
TECH.8.2.12.E.2	Analyze the relationships between internal and external computer components.
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.

Essential Questions

How does material choice and structure affect output in a mechanical system?

How do real world results compare to computer modeling?

How do you choose which machine/tool to perform a specific process?

What is the relationship between the digital design/coding and the physical design?

Why is it important to have useful and accurate data when creating a design?

Content / Skills

Coding

Robotic Systems

Fabrication

Machining

Measuring

Assembly

Computer/Digital Literacy

3D Design

Rendering and Animation

System Communications