



# Southmoreland School District

## Introduction to Automation Curriculum Overview

### **Introduction to Automation Overview:**

This course will introduce students to various properties of engineering materials and material processes in how they apply to modern manufacturing. High in demand, careers or internships are easily available for senior year students and graduates with interest in the field. The utilization of computer aided drafting (CAD) and development of machine code for computer numeric control (CNC) machines will be the focus of the course.

### **Module Titles:**

**Module 1: Careers in Manufacturing & Automation**

**Module 2: Machine Safety**

**Module 2: Material Properties**

**Module 3: Machining Processes**

**Module 4: G-Code Development**

**Module 5: Modern CNC coding**

### **Module Overviews:**

**Module 1: Careers in Manufacturing & Automation**

The world of manufacturing is often seen as a dirty work environment, this is not always the case. Students will explore a variety of career paths in manufacturing including management, design, marketing, and the actual material processing which take raw materials and produce finished goods for personal and commercial use. Students will note the necessary education and skills needed through high school that can potentially lead to an internship prior to graduation or apprenticeship after graduation.

**Module 2: Machine Safety**

Students will learn about various tools and machines within the material processing environment. Teacher lead demonstrations will be provided and all students must pass a written (and sometimes practical) examination of the machine to use within the course. \*Student safety packets are good for the entire school year and must be completed each year.

**Module 2: Material Properties**

Manufacturing is the processing of materials into finished products or goods. Students will explore a variety of material types and categorize them based on their chemical and physical properties. These must be reviewed during the development of finished goods



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to ensure materials are being used in the most efficient manner possible as well as maintaining the appropriate structural integrity.

### **Module 3: Machining Processes**

Students will discuss primary machining processes; those that take raw materials from the earth and process into standard stock as we find in home improvement stores.

Students will then discuss secondary processes which take that standard stock and produce finished goods. Students will explore or produce products that are commonly produced through casting and molding, forming, separating, conditioning, assembling, and finished processes.

### **Module 4: G-Code Development**

The backbone of automation was the development of the Computer Numerical Control Machinery. CNC mills take coordinates and create a machine code that will cut out and or engrave a variety of materials. Students will develop simple G-Code long hand to understand the process behind how the machine operates and the various functions of the code.

### **Module 5: Modern CNC coding**

Once students have the basic understanding of developing G-Code, students will apply those skills through how modern CNC code is developed through creating vectors through Computer Aided Drafting (CAD) systems assigning various toolpaths to those vectors. Students will explore this process through a variety of different tooling options. The students will receive an inhouse demonstration of how products are developed from idea, to design to final project.