PLTW Automation and Robotics
Syllabus

Millbrook Middle School

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Dear Parents and Future Engineers,

Welcome to Automation and Robotics! In this course, students will trace the history, development, and influence of automation and robotics as they learn about mechanical systems, energy transfer, machine automation, and computer control systems. Students use the VEX Robotics® platform to design, build, and program real-world objects such as traffic lights, toll booths, and robotic arms. Even if you do not wish to pursue a career in programming or coding, the critical thinking skills required will be valuable for everyone!

Course Objectives:

By the time the course is finished, students will be able to:

- Describe the purpose of automation and robotics and their effect on society.
- Use the characteristics of a specific mechanism to evaluate its purpose and applications.
- Apply knowledge of mechanisms to solve a unique problem for speed, torque, force, or type of motion.
- Know how to use ratio reasoning to solve mechanical advantage problems.
- Design, build, wire, and program both open- and closed-loop systems.
- Use motors and sensors appropriately to solve robotic problems.
- Troubleshoot a malfunctioning system using a methodical approach.

Automation and Robotics Units:

- What is Automation and Robotics?
  - Students will learn how automation and robotics affect everyday life both positively and negatively, including safety, comfort, choices, and attitudes about a technology's development and use.
- Mechanical Systems
  - The activities in this unit will introduce the students to several mechanisms that are used to change speed, torque, force, type of movement, and direction of movement. These mechanisms have been developed over time to address the need for changes in machine tools, robots, automobiles, airplanes, etc.
- Automated Systems

- Upon completion of this unit, students will have a better understanding of the necessary components of a flexible manufacturing system and the programming necessary for communication between the sensors, motors, and building components.

Class Expectations:

- Students will come prepared to class every day.
- Students will come to class ready to learn and focused on classwork.
- Students will follow all safety procedures. Because we are working with tools and electrical circuits, there is zero tolerance for unsafe practices. If a student chooses not to follow safety procedures, parents will be notified immediately, and the student will lose hands-on privileges for that assignment. The student will be given an alternate, written assignment to protect themselves and others.
- Mrs. Licina is here to help students. Students should feel comfortable asking for help if they are unsure. Mrs. Licina is always willing to spend extra time with students to ensure they understand if a student is struggling.
- Students will be respectful and honest at all times.
- Students will participate in all class activities including, but not limited to: taking notes, copying down example problems, group activities, partner activities, computer assessments, watching videos, exit slips, and classroom discussions.

Classwork Policy:

Programming can be both exciting and complicated. The programming platform that is used in this class is called RobotC. Students will have plenty of time to finish in class if time is used wisely, so students will not receive homework outside of class. There will be project and daily grades, each accounting for 50% of the final grade.

Equipment Policy:

Students will be paired up and given materials to use during each of the units and projects. Students are responsible to handle equipment with care. Accidents happen, however, students will be assigned specific materials and are expected to return them in the same state it has been given. Robotics materials are not to leave the computer science classroom unless express permission is given by Mrs. Licina under rare conditions.