

Course: Automation and Robotics

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Overview:

PLTW Automation and Robotics is more than just another middle school engineering program. It is about applying engineering, science, math, and technology to solve complex, open-ended problems in a real-world context. Students focus on the design process, and develop the ability to innovate, think critically, and collaborate to resolve problems. Students are introduced to concepts that allow for creativity and objective thinking to design and solve a variety of problems. The emphasis is on the ability to reflect, discover, and then create, not on getting the "right" answer. They learn how to apply STEM knowledge, skills, and habits of mind to make the world a better place through innovation. STEM education is at the heart of today's high-tech, high-skill global economy. For America to remain economically competitive, our next generation of leaders must develop the critical-reasoning and problem-solving skills that will help make them the most productive in the world. PLTW sparks ingenuity, creativity, and problem-solving skills in all our students.

Skills and Strategies:

Students will develop these skills below:

- Students will learn 21st Century Skills to use in their future jobs.
- Organize and clean their work space and the classroom at the end of each class.
- Describe the relationship between science, technology, engineering, and math.
- Use the design process to solve a technical problem.
- Understand how an algorithm is a procedure or formula for solving a problem
- Use ratios to solve mechanical advantage problems.
- Use numerical and algebraic expressions and equations to solve real-life problems, such as gear ratios.
- 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.
- Coding using "Robot C".

Course Learning Goals:

Three main objectives will be focused on in class:

- Students will be exposed and navigate through the Common Core State Standards for Mathematics, English Language Arts, and the Next Generation Science Standards. Specific emphasis will be placed on Engineering and Robotics.
- Develop proficient ways to design, build and test robotic systems.
- Students will develop highly transferable skills in collaboration, communication, and critical thinking, which are relevant for any coursework or career.

Student Expectations:

Students will be expected to be positive, polite, and prompt. They are encouraged to do their best work the first time. High expectations in class and at school will be maintained throughout the year using student planners, engineering journals/portfolios, and weekly grade checks.

Workload:

Most of the workload will be done in class. Students will work in groups, so it is important they come to school to participate. Students that are absent must get a SAT pass to come in and make up their work.

Grading:**Grading Categories:**

90 - 100%	3.7 - 4.0
80 - 89%	2.7 - 3.6
70 - 79%	1.7 - 2.6
60 - 69%	1.0 - 1.6
0 - 59%	0.0 - 0.9