



# Course Overview

High School | Robotics I - Last Updated on April 4, 2025

## DESCRIPTION

### K-12 Content Area | Mission & Philosophy Statement

- Young people are born investigators, with natural curiosities about the physical, biological, and social worlds they experience. Anchoring science learning in real-world phenomena connects curiosities to core conceptual understandings.
- Students actively construct understanding through inquiry, experimentation, and analysis to develop science and engineering practices such as asking questions, planning and carrying out investigations, and constructing explanations.
- Integration of crosscutting concepts such as patterns, cause and effect, and systems thinking promote interdisciplinary understanding and sense-making of the natural world.
- Science learning occurs alongside other disciplines to foster holistic understanding and application of knowledge.

### Course Description

The High School Robotics I course offers students an exciting opportunity to explore the world of robotics through hands-on learning experiences. The main topics of the course include the engineering design process, CAD & fabrication, robotics theory, and project management. Students will learn how to design, build, and program robots to perform various tasks and challenges. Students will work collaboratively in teams to design and construct robotic systems using state-of-the-art hardware and software platforms. They will learn to integrate sensors, motors, and other components to create robots capable of performing autonomous actions and responding to their environment. Additionally, students will develop proficiency in programming languages such as Blocks or Java to control the behavior of their robots and solve complex problems.

The course emphasizes critical thinking, creativity, and innovation as students tackle real-world engineering challenges. Students will engage in project-based learning activities to apply their knowledge and skills in practical contexts. Throughout the course, students will also explore ethical considerations, safety protocols, and societal implications related to robotics technology. By the end of the course, students will have gained an understanding of engineering principles and practices, as well as valuable skills in teamwork, communication, and problem-solving. Whether pursuing further studies in engineering or simply exploring their interest in robotics, students will emerge from this course equipped with the knowledge and confidence to succeed in a rapidly evolving technological landscape.

Note: Maximum 21 students per section.

## STANDARDS

**Pennsylvania - Grade 9-12 - Science, Technology & Engineering, And Environmental Literacy & Sustainability Standards (STEELS) (2023)**



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3.5.9-12.I

3.5.9-12.J

3.5.9-12.L

3.5.9-12.N

3.5.9-12.P

3.5.9-12.Q

3.5.9-12.S

3.5.9-12.U

3.2.9-12.Q

3.5.9-12.B

3.5.9-12.G

3.5.9-12.W

3.5.9-12.Y

3.5.9-12.AA

3.5.9-12.DD

3.5.9-12.LL

3.5.9-12.MM

3.5.9-12.OO

3.5.9-12.PP

### COURSE OBJECTIVES

The objectives are the course are to meet the Pennsylvania State Standards in Science and Technology.

### ASSESSMENT TYPES

The following assessment types will be used during the course:

- Curriculum Based Measures
- Formative Assessments
- Summative Assessments
- Performance Based Assessments

### SUGGESTED METHODS OF INSTRUCTION

A science program demands the use of a variety of instructional strategies to foster scientific thinking. Below is a list of suggested strategies for high-quality instruction:

- Instructional components outlined in *Framework for Teaching* by Charlotte Danielson
- Hands-on learning
- Posing questions for investigation
- Cooperative learning and collaboration
- Inquiry, engineering, and design