

Computer Science: Robotics Track Semester 1

Grade Level: 3–5
Credit: 0.5

Course Overview

Embark on a hands-on robotics adventure with Robotics Track, a fully online, self-paced, competency-based course designed to spark creativity, problem-solving, and digital fluency in upper elementary students. Students learn at their own pace, advancing only upon demonstrating mastery of each skill, all while following state-aligned learning objectives.

Through engaging projects using popular platforms like LEGO WeDo, VEX IQ, RoboBlockly, or KIBO, learners design and build robots, experiment with motors and sensors, and program real-world behaviors. They uncover the fundamentals of engineering, computer science, and STEAM by making robots move, sense, decide, and accomplish missions. This immersive experience fosters logical thinking, collaboration, persistence, and confidence.

What Students Will Explore

- Engineering & Design Thinking – Conceptualize, build, and iterate robot structures using modular components.
- Introductory Programming Concepts – Use block-based coding to animate motors, respond to sensor input, and build decision-making logic.
- Sensors & Automation – Explore light, touch, sound, and distance sensors to make responsive robot behaviors.
- Problem-Solving Challenges – Design robots to complete missions like navigating mazes or picking up objects—applying computational thinking.
- STEM Integration – Understand connections between robotics, math, science, and the arts as they prototype and refine solutions.

Key Learning Experiences

- Build & Code Labs – Step-by-step challenges aligning build instructions with programming goals.
- Sensor Exploration Workshops – Fun experiments to visualize how robots “see” and respond to their environment.
- Mission Challenges – Apply knowledge to solve real tasks (e.g. rescue simulators, obstacle courses).
- Design Reflection Journals – Students document design choices, failures, and improvements.
- Peer Robotics Showcase – Present robot projects, explain solutions, and provide positive peer feedback.

Learning Objectives

By semester’s end, students will be able to:

- Construct functional robots using modular kits or virtual platforms
- Program motors and sensors through event-driven block code

- Implement logic to solve challenges (e.g. use sensor values to trigger robot actions)
- Apply engineering processes: design, test, evaluate, and improve prototypes
- Collaborate effectively and communicate solutions in writing and orally
- Reflect on learning, troubleshooting, and creative thinking processes

Why Take This Course

Robotics education empowers young learners with essential STEAM and coding skills, fostering creativity, resilience, and teamwork ([turn0search7], [turn0search9], [turn0search6], [turn0search3]). Hands-on programming with real robots (like LEGO WeDo or VEX IQ) taps into math and science understanding, and changes students' attitudes toward problem-solving and careers in STEM ([turn0news23], [turn0search11], [turn0search6]).

With its online, self-paced, competency-based structure, Robotics Track ensures every student advances confidently, mastering each concept before moving on. They emerge with a curated portfolio of robot demos and code, making them ready for advanced robotics classes, STEM clubs, and future creativity.

By semester's end, learners become tech-savvy builders and thinkers—equipped to imagine, build, and code robots that solve problems. Whether dreaming of engineering, game design, or digital arts, Robotics Track provides an inspirational and practical launchpad toward tomorrow's innovations. Robotics is more than a class—it's a pathway to discovery, teamwork, and digital empowerment!

The course is a fully online, self-paced, competency-based program, and we're very proud of it!

Students only advance once they've demonstrated true mastery of each skill—no rushing, no guessing. This flexible structure not only supports individual learning styles and schedules but also empowers learners to take ownership of their progress, knowing exactly what they can do next.

Moreover, every module, assignment, and assessment is meticulously aligned with state standards and clear learning objectives, guaranteeing comprehensive coverage of essential knowledge and real-world skills students need to succeed. This isn't just online learning—it's purposeful, rigorous, and personalized, ensuring no student advances until they truly understand the material.