



FIRST® Robotics Engineering Explorations Course Overview

Essential Components		
<ul style="list-style-type: none"> • Robotics • Programming • Computational Thinking • Project Management 	<ul style="list-style-type: none"> • Engineering • Problem Solving • College and Career Readiness 	<ul style="list-style-type: none"> • Design Thinking • Communication • Teamwork • Collaboration

Course Description

FIRST® Robotics Engineering Explorations course provides students with experiences in engineering, robotics, programming, and game-based learning. FIRST® revolves around a defined set of Core Values and gives students authentic, real-world learning experiences. Working as part of a team, students use what they learn through FIRST to research and design an innovative solution to a real-world problem. At the same time, students will work in teams to build their own game-ready robot to show off at an event at the end of the course. Students practice 21st century skills like technical writing, presentation skills, communication, project management, collaboration, and teamwork.

Outcomes

STUDENTS WHO COMPLETE THE FIRST ROBOTICS ENGINEERING EXPLORATIONS COURSE GET TO:

- Design, build, and program a robot to compete in a robotics challenge.
- Present an innovative robotics-based solution to a real-world problem.
- Demonstrate FIRST Core Values.
- Explore a variety of STEM based careers and investigate the skills and the level of education each requires.

UNIT	OBJECTIVES
Unit 1: Welcome to <i>FIRST</i>	<ul style="list-style-type: none"> • Explore what it means to be a part of <i>FIRST</i>. • Research and think about ways robots can improve people's lives. • Explore a variety of career options and the varying levels of education needed for them. • Use basic materials to solve engineering challenges. • Design a game for the teams to compete in.
Unit 2: Build a Bot	<ul style="list-style-type: none"> • Design and build a robot chassis that can complete a game-based challenge while researching ways in which robotics is used in your community. • Get to know your kit of parts. • Explore real-world chassis designs. • Introduce movement, control, and power.
Unit 3: Make It Move	<ul style="list-style-type: none"> • Configure and program a robot to perform driver-controlled movements. • Develop and troubleshoot driver-controlled programs. • Collect data about your robot using telemetry.
Unit 4: Programming Autonomous Robots	<ul style="list-style-type: none"> • Develop and troubleshoot autonomous programs and sensors. • Explore the differences between driver-controlled and autonomous modes. • Explore sensor configuration and functions.
Unit 5: Build and Program Manipulators	<ul style="list-style-type: none"> • Build and program an arm and manipulator that works in autonomous and driver-controlled modes. • Research basic arm and manipulator designs. • Program and test a robotic manipulator in autonomous and driver-controlled modes.

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