

# Falfurrias Junior High

## Intro to Robotics (Principles of Applied Engineering)

### 2025-2026 School Year

#### Course Description:

Welcome to Intro to Robotics! This course provides an overview of the various fields of engineering and their interrelationships. Students will apply the engineering design process to plan, design, build, test, and program robotic systems. We will develop engineering communication skills, including technical writing, presentations, and the use of computer-aided design (CAD) software. Through hands-on, project-based learning, students will explore the fundamentals of electrical and mechanical systems, basic programming, and problem-solving, all while preparing for future STEM careers.

#### Teacher: Kurt Mann

Contact Information: [kurt.mann@bcisdistrict.net](mailto:kurt.mann@bcisdistrict.net)

Room: 123

#### Units of Study:

Six Weeks	Unit Title	Key Focus Areas
1st	<b>Unit 01: The Engineering Design Process</b>	- Introduction to robotics, lab safety, and professional standards. - Investigation of the history and progression of technology. - Introduction to the engineering design process (design brief, brainstorming, sketching). - Setting up and maintaining an engineering notebook.
2nd	<b>Unit 02: Mechanical Systems &amp; Structures</b>	- Investigation of simple machines and mechanical advantage. - Design and construction of a robotic chassis. - Understanding and

		<p>applying gear ratios, pulleys, and linkages.</p> <p>- Introduction to Computer-Aided Design (CAD) software for design and visualization.</p>
3rd	<b>Unit 03: Electrical and Electronic Systems</b>	<p>- Application of basic electronic theory (Ohm's Law, circuits).</p> <p>- Identification and use of electrical components (motors, batteries, sensors).</p> <p>- Wiring and prototyping circuits on a breadboard.</p> <p>- Soldering and proper use of electrical tools.</p>
4th	<b>Unit 04: Fundamentals of Robot Programming</b>	<p>- Introduction to block-based or text-based programming for robotics.</p> <p>- Applying principles of control systems and sequential logic.</p> <p>- Writing code to control motors and actuators.</p> <p>- Using loops and conditional statements to create autonomous behaviors.</p>
5th	<b>Unit 05: Sensing &amp; Automation</b>	<p>- Understanding the use of sensors (e.g., ultrasonic, color, gyroscope).</p> <p>- Programming robots to interact with their environment using sensor feedback.</p> <p>- Calibrating sensors for accurate data collection.</p> <p>- Developing solutions for a defined</p>

		problem using a robotic system.
6th	<b>Unit 06: Capstone Project &amp; Career Exploration</b>	- Team-based capstone design project. - Project management: planning, execution, and documentation. - Presentation of final design, findings, and a working prototype. - Researching career paths in engineering and robotics.

### Grading Policy:

Grades will be based on the following:

- **Projects & Labs:** 60%
- **Engineering Notebook/Portfolio:** 25%
- **Class Participation & Employability Skills:** 15%

Specific rubrics for major projects will be provided at the start of each unit.

### Classroom Expectations:

- Safety first! Follow all lab and classroom safety rules at all times.
- Be a productive team member. Engineering is a collaborative process.
- Maintain your engineering notebook with clear, detailed, and up-to-date entries.
- Come to class prepared with all necessary materials.
- Seek help and ask questions when you encounter challenges.

### Materials Needed:

- Notebook (digital or physical) and writing utensils
- A folder or binder to store handouts
- Access to a computer (provided by the school)
- [List any specific kits, tools, or components students might need to provide]

### Note to Parents/Guardians:

This course is a hands-on experience that will challenge your student to think like an engineer. Please encourage them to talk about their projects and progress. Their engineering notebook is a great way to see what they are working on in class. I'm always available to discuss your child's progress, so please feel free to reach out via email.

*Dates and unit durations are approximations and may be adjusted based on student needs and progress. This syllabus is subject to change.*