

# Falfurrias Junior High

## Robotics I (TEKS §127.395)

### 2025-2026 School Year

#### Course Description:

Welcome to Robotics I! This course builds upon the principles of engineering by providing a lab-based, hands-on curriculum focused on the design, construction, and programming of robotic devices. Students will engage in a rigorous study and application of electromechanical systems, including advanced electrical components, sensors, and actuators. A key focus will be on the engineering design process, technical communication, and professional documentation as students prepare for careers in robotics and automation. Through project-based learning, students will develop skills in problem decomposition, algorithm design, and systematic troubleshooting.

#### 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	Unit 01: Foundations of Robotics	<ul style="list-style-type: none"><li>- In-depth review of lab safety and professional standards.</li><li>- Investigation into the history and ethical implications of robotics and automation.</li><li>- Analysis of a robot's core components (control system, power source, manipulator, etc.).</li><li>- Advanced use of an engineering notebook for professional documentation.</li></ul>
2nd	Unit 02: Advanced Mechanical Systems	<ul style="list-style-type: none"><li>- Detailed study of mechanical advantage, including torque and power</li></ul>

		<p>transmission.&lt;br&gt;- Hands-on design and construction of complex robotic chassis and subsystems.&lt;br&gt;- Application of Computer-Aided Design (CAD) for multi-part assemblies.&lt;br&gt;- Fabrication techniques and use of specialized shop tools.</p>
<b>3rd</b>	Unit 03: Applied Electrical & Electronic Theory	<p>- Practical application of Ohm's Law and circuit analysis (series and parallel).&lt;br&gt;- Use of multimeters for troubleshooting and measurement.&lt;br&gt;- Integration of motors, actuators, and various power sources.&lt;br&gt;- Safe work practices for electrical systems, including lockout/tagout procedures.</p>
<b>4th</b>	Unit 04: Programming & Control Systems	<p>- Introduction to structured, text-based programming languages for robotics.&lt;br&gt;- Development of algorithms using flow charts and problem decomposition.&lt;br&gt;- Implementation of sequential and behavioral programming logic.&lt;br&gt;- Writing and debugging code to control complex robotic movements.</p>

<p><b>5th</b></p>	<p>Unit 05: Sensory Feedback &amp; Automated Systems</p>	<p>- Comprehensive study of various sensor types (e.g., encoders, potentiometers, infrared, ultrasonic). - Integration of sensor data for creating closed-loop control systems. - Programming autonomous behaviors based on real-time environmental feedback. - Calibration and testing of sensors for consistent performance.</p>
<p><b>6th</b></p>	<p>Unit 06: Capstone Design Challenge</p>	<p>- Team-based design, build, and program challenge. - Project management, including scheduling, resource allocation, and documentation. - Presentation of the final robotic prototype and project report. - Exploration of advanced career pathways and industry certifications in robotics.</p>

**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 is paramount. Follow all lab and classroom safety rules and procedures.
- Be a constructive and collaborative team member.

- Maintain a detailed engineering notebook documenting your design process, code, and test results.
- Come to class prepared to engage in hands-on work and problem-solving.
- Actively seek help and use troubleshooting skills when faced with 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 designed to be a challenging and rewarding experience that will prepare your student for advanced engineering coursework and future careers. Their engineering notebook will serve as a portfolio of their work and a valuable tool for showcasing their skills. Please feel free to reach out via email with any questions or concerns.

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