

Fafurrias Junior High

Robotics II (TEKS §127.396)

2025-2026 School Year

Course Description:

Welcome to Robotics II! This advanced course expands on the principles of Robotics I by diving deeper into artificial intelligence, advanced programming, and complex electromechanical systems. Students will apply an in-depth understanding of the engineering design process, advanced physics concepts (like acceleration and velocity), and project management to solve complex, real-world problems. This course emphasizes independent and team-based projects, preparing students for industry certifications and post-secondary education in STEM fields.

Teacher: Kurt Mann

Contact Information: kurt.mann@bcisdistrict.net

Room: 123

Units of Study:

Six Weeks	Unit Title	Key Focus Areas
1st	Unit 01: Advanced Engineering Design	Advanced project management and planning. - Analysis of complex robotic systems using the Engineering Design Process. - Use of technical communication and project documentation for team collaboration. - Exploration of ethical considerations and emerging trends in robotics.
2nd	Unit 02: Kinematics & Applied Physics	Applying concepts of acceleration and velocity to robot motion. - Understanding and

		<p>calculating Degrees of Freedom (DOF) for robotic manipulators.</p> <p>- Programming robots for precise, multi-axis movements (joint, linear, circular).</p> <p>- Utilizing precision measuring instruments to validate system performance.</p>
3rd	Unit 03: Advanced Programming & Control	<p>Deconstructing complex problems into programmable modules.</p> <p>- Writing and implementing advanced control algorithms and functions.</p> <p>- Using variables, arrays, and subroutines to create efficient code.</p> <p>- Debugging and troubleshooting software and hardware integration issues.</p>
4th	Unit 04: Artificial Intelligence & Autonomous Systems	<p>Introduction to AI concepts as they apply to robotics.</p> <p>- Implementing advanced sensory feedback for machine perception.</p> <p>- Programming robots to make decisions based on complex data inputs.</p> <p>- Designing and building a robot that can navigate and interact with a dynamic environment.</p>
5th	Unit 05: Fabrication & Manufacturing Processes	<p>Mastery of specialized fabrication tools and</p>

		<p>techniques.</p> <ul style="list-style-type: none"> - Using advanced CAD and CAM (Computer-Aided Manufacturing) software. - Applying knowledge of materials science for robot construction. - Understanding and implementing industry-standard safety procedures like lockout/tagout.
6th	Unit 06: Final Robotics Competition & Portfolio	<ul style="list-style-type: none"> - Team-based, large-scale design challenge in a competitive environment. - Presenting a professional engineering portfolio and final report. - Documenting project iterations, failures, and successes. - Preparing for industry certification exams and discussing career pathways.

Grading Policy:

Grades will be based on the following:

- **Major Projects & Team Challenges:** 65%
- **Engineering Portfolio & Documentation:** 20%
- **Technical Presentations & Teamwork:** 15%

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

Classroom Expectations:

- Uphold the highest standards of safety and professionalism in the lab.
- Act as a leader and a collaborative team member on all projects.
- Your engineering portfolio is a critical component of this course; ensure it is meticulously maintained.

- Be proactive in your learning, research, and problem-solving.

Materials Needed:

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

Note to Parents/Guardians:

This course will push your student to apply the knowledge and skills they've developed to solve complex problems. The final project and portfolio are excellent tools for them to showcase their abilities to future employers or university admissions. Please don't hesitate to reach out with any questions.

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