

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT



Robotics

Board Approval Date: November 21, 2024	Course Length: 1 Semester
Grading: A-F	Credits: N/A
Proposed Grade Level(s): 6, 7, 8	Subject Area: Elective Elective Area (if applicable): Science
Prerequisite(s): None	Corequisite(s):
CTE Sector/Pathway: Engineering and Architecture/Engineering Design	
Intent to Pursue 'A-G' College Prep Status: No	
A-G Course Identifier:	
Graduation Requirement: No	
Course Intent: Program (if applicable):	
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COURSE DESCRIPTION:

In the Robotics program, students delve into the world of robotics, taking on the role of interns. Working together, they craft prototypes that cater to the unique demands of clients, while also mastering the design and evaluation of complex mechanical systems, including comprehensive learning about gear systems. Furthermore, this class will integrate into the CTE Industry Sector of Engineering and Architecture and the CTE Pathway for Engineering Design offered in high school.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Mechanical Systems	How do gear trains and other mechanisms transfer movement in mechanical systems?	*Build functioning gear trains *Draw multi-perspective sketches of gear trains	*Create website presenting info on all gear
2. Applied Mechanics	How do designing, building, and programming automated systems meet the needs of clients?	*Utilized Engineering Design Process via Sketchbook *Appropriately addressing criteria and constraints	*Windmill construction *Pull Toy Construction *Survival build challenge
3. Programming Robots	How can you create programs that include sequences, events, loops, and conditionals? How would you decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process?	*VEX code VR activities	*Programming sensors on testbeds
4. What is CTE?	What are the industry sectors and pathways in CTE? What careers are of interest and match my aptitudes? Why is it important to plan for high school, college and a future career? What skills and behaviors do employers expect?	*Research outlines and flow charts *Research the Career Technical Student Organization (CTSO) SkillsUSA and identify middle school offerings and competitions	*Career exploration research project to identify areas of interest, aptitudes, skills and education requirements using online resources (i.e., California Career Zone and CalCRN)
5. California's Career Technical Education - Industry Sector Standard	What is the <u>Engineering and Architecture</u> industry sector? What is the sub-pathway <i>Engineering Design</i> about? What career	*Research outlines and flow charts *Research local and global job markets and college opportunities.	*Deeper dive into a project about a career and the skill sets needed for a particular area of the <i>Engineering Design</i>

	opportunities are there locally and globally?		career pathway.
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ESSENTIAL STANDARDS:

Middle School NGSS Science Standards

MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

Middle School NGSS Engineering Design Standards

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impact on people and the natural environment that may limit possible solutions.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they met the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

CA CSS Math

6RP

1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6NS

1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

California Standards for Mathematical Practice

1) Make sense of problems and persevere in solving them.

3) Construct viable arguments and critique the reasoning of others

5) Use appropriate tools strategically

6) Attend to precision

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):

Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.

<https://www.cde.ca.gov/be/st/ss/documents/finaelaccsstandards.pdf>

<https://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaog2013.pdf>

Link to Framework (if applicable):

Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the

Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

Link to Subject Area Content Standards (if applicable):

Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.

Engineering and Architecture Pathway Standards

C2.0 Acquire and accurately use Engineering and Architecture sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

C3.0 Understand the sketching process used in concept development.

C5.0 Use proper projection techniques to develop orthographic drawings.

C7.0 Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Engineering and Architecture sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

C8.0 Understand and apply proper dimensioning standards to drawings.

Link to Program Content Area Standards (if applicable):

Program Content Area Standards apply to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

Link to Career Readiness Practice - Pages 18-19

[Career Technical Education Model Curriculum Standards](#)

Link to California Industry Sector Standards - Pages 12 - 13

Engineering and Architecture <https://www.cde.ca.gov/ci/ct/sf/documents/enginearchit.pdf>

TEXTBOOKS AND RESOURCE MATERIALS:

Textbooks

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
		N/A				