Robotics [2 Year Pathway]

CTE Year 1 - Introduction to Engineering

Autodesk's VEX Robotics Curriculum is divided up into twelve primary units and one optional unit. In a flexible format, students learn about engineering and engineering problem solving. They will be given introductions to the VEX Robotics Design System and Autodesk® Inventor® while learning key STEM principles through a process that captures the excitement and engagement of robotics competition. The curriculum is heavily focused on mechatronic principles; as such, programming is NOT required. However this course is structured in such a way that teachers and students who want to include a more Computer Science heavy layer with the course can do so.

[This course meets A - G requirements, articulation with Solano Community College, Mechatronics 101]

CTE Year 2 - Competitive Robotics

In this course students use advanced programming logic to prepare mobile robots for VEX Robotics Competitions. They also refine engineering and problem solving skills during the robot construction phase while developing game experiences and strategies.

[This course meets A - G requirements, articulation pending as of 09.15.2022]

CTE Endorsement

A student qualifies for a CTE endorsement on their high school diploma after successfully completing the following criteria: 1) completion of a CTE course of study in a program area, 2) completion of academic requirements governing receipt of a standard diploma, and 3) meet all requirements for the issuance of the Certificate of Skill Attainment.

Robotics Pathway Learning Outcomes

By the end of this course, WCW students will have experience in/knowledge of the following topics:

- General engineering principles and definitions.
- How mechatronic inventions have revolutionized the manufacturing community.
- Use robotics/lab equipment safely to achieve a goal or engineering solution.
- Working towards and earning an OSHA 10 certification.
- The essential physicals behind force and motion as it applies to engineering.
- Describe common hydraulic and pneumatic systems as they apply to robotics.
- Electrical fundamentals (AC/DC) circuitry and the forces of magnetism.
- Control system concepts, C++ programming and PLC control systems.
- Modern applications of the world of robotics.

Course Content

Unit 1: Introduction to Engineering

Unit 2: Introduction to Robotics

Unit 3: Introduction to VEXnet

Unit 4: Introduction to 3D Design

Unit 5: THE GAME!

Unit 6: Object Manipulation

Unit 7: Speed, Power Torque & DC Motors

Unit 8: Mechanical Power Transmission

Unit 9: Drivetrain Design

Unit 10: Lifting Mechanisms

Unit 11: Systems Integration

Unit 12: Testing and Iteration Process

Unit 13: Design a Component (opt)

Unit 14: Game Strategy

Supplies

Binder, pen/pencil for written assignments.

Course Requirements

The student will be expected to meet the same academic demands as per the articulation agreement with Solano Community College Mechatronics 101 course.

- Standing and walking on hard surfaces
- Comprehension of a repair manual
- Heavy lifting

- Handling potentially dangerous equipment
- Cleaning of floors, work-surfaces, tools, and equipment

Course Policies

Attendance: It is imperative that students are in class.

Tardies: Students must be in the door by the time the tardy bell rings or they shall be counted tardy.

Class Participation

This is a very hands-on class. In order to get the most out of it you MUST participate. Participation will be monitored. Participation points will be reflected throughout your grade.

Student Expectations

- Come to class prepared everyday
- Active Participation
- Professional behavior towards instructor and classmates
- Be ready to learn

Late Assignments

A student will be marked down for late assignments without a proper excused absence. Missed repair labs can be made up either at home or an alternative assignment can be given for excused absences.

Donations

Parts, Components or Kit donations from VEX Robotics are highly appreciated.