AUTOMATION AND ROBOTICS

PROGRAM DESCRIPTION

The Automation and Robotics instructional program prepares students to apply basic engineering principles and technical skills for industrial automation control systems and technologies with the artificial intelligent management of machines on production lines in the manufacturing industry. Industrial automation and robotics are about the control of physical processes: using physical machines, robots, and control systems to automate motions as part of an industrial process.

Course Outcomes

This course seeks to expose students to many different industrial processes. The expectation is that students find an area of interest they can pursue as a career path. We will explore the following this year:

Robotics 1 (Emphasis placed on 3d Drafting)

- **EXAMINE** THE IMPACT OF NEW TECHNOLOGIES ON AUTOMATION AND ROBOTICS
- **INTRODUCE** ELECTRICAL AND ELECTRONIC TASKS
- **INTRODUCE** USE OF VARIOUS FORMS OR ELECTRICAL MOTORS
- **INTRODUCE** MECHANICAL SYSTEMS LINKAGES TASKS
- **IDENTIFY** INDUSTRIAL ROBOT TYPES AND THE TASKS THEY PERFORM
- **INTRODUCE** MANUFACTURING PROCESSES IN AUTOMATION
- **DEMONSTRATE** SAFETY
- **MASTER** DRAFTING TASKS
    - STUDENTS WILL PASS INDUSTRY CREDENTIAL (CSWA)

Robotics 2 (Emphasis placed on custom fabrication)

- **MASTER** ELECTRICAL AND ELECTRONIC TASKS
- **ANALYZE** HYDRAULIC AND PNEUMATIC SYSTEMS
- **ANALYZE** PROGRAMMABLE LOGIC CONTROLLER (PLC) SYSTEMS
- **MASTER** THE USE OF VARIOUS FORMS OR ELECTRICAL MOTORS
- **MASTER** MECHANICAL SYSTEMS LINKAGES TASKS
- **EXAMINE** DATA COMMUNICATION METHODOLOGIES
- **APPLY** SENSOR SOLUTIONS
- **MASTER** MANUFACTURING PROCESSES IN AUTOMATION
- **DEVELOP** ROBOTICS APPLICATION SYSTEMS
- **DEMONSTRATE** SAFETY

What Do I Need To Bring To Robotics

While we strive to provide as much supplies as possible we do require some item for students to be prepared for class.

- Flash drive to save student work. (nothing fancy 1 gb will work)
- Safety glasses (students will be required to wear safety glasses in shops. Harbor freight sells pairs a $1)
- Pen

What Do I need to wear to robotics class

Custom fabrication and machining require the use of PPE(Personal protective equipment). Students must wear Safety glasses and closed-toe shoes while working in the shop.

Grading

This course uses standard based grading (SBG) to assess student learning outcomes. A benchmark exam at the conclusion of Quarter 1, 2, and 3 will assess student mastery of content. Additionally student projects are evaluated for grades.

Capstone Project

At the start of 4th quarter students will start a Capstone project to demonstrate master of course standards. The capstone project for Robotics 1 will be the build of a combat robot. Students must build and participate in a battle bot event for this project. Students may work individually or in groups of 2 students. Students may choose to participate in either an Ant class division (1 lb) or Beetle class division (3lb). This project will require students to demonstrate mastery of Solidworks, additive manufacturing, custom fabrication, electrical tasks, and mechanical systems. While we strive to have no class fee, students will need to raise funds to fund the build of their robot. ANT Class robot will cost around $150 and Beetle class will cost $350.

END of Course Exam

At the end of quarter 3 students will take an end of course exam to demonstrate mastery of content. Robotics 1 will show mastery on the Certified SOLIDWORKS Associate in Mechanical Design (CSWA). This exam focuses on the drafting standards and earns students an industrial certification. Students must pass this exam to move to

robotics 2. Students have unlimited attempts at this exam to show mastery. Robotics 2 students will show mastery on Technical Skills Assessment (TSA). This exam tests all the standards taught throughout the program. Students must pass this exam to move to robotics 3

Attendance Expectation

Automation and robotics is a project based, hand on course that utilizes specific software and tools. Little to no work can be completed remotely or at home. Therefore for studetends to be successful they must be present in class. Highly encourage students that need additional time or instruction to attend Friday open shop time 8:30 to 11:30 on reteach fridays.

Robotics core values

Discovery: We explore new skills and ideas.
Innovation: We use creativity and persistence to solve problems.
Impact: We apply what we learn to improve our world.
Inclusion: We respect each other and embrace our differences.
Teamwork: We are stronger when we work together.
Fun: We enjoy and celebrate what we do!

Class Expectations

- Safety is very important. We have tools that can cause injury. Students must show safety in the number one priority in robotics facilities. Examples of safe behavior include but are not limited to: No running, push or trip other students, focusing on the tool you are working with.
- Student are to only go on shop when given instructor approval to do so.
- Bookbags are to remain in the computer classroom at all times.
- NO CELL PHONES or headphones on being one student. These items are to remain in bookbag at all times.

Overview

- This is a rigorous program that requires students to pass an industry certification
- Student will show mastery of content on Benchmark exams and an end of year exam
- Students will show mastery of content based on project based builds, including a capstone project of combat robotics which will require to raise money to fund.

I _____ (Student Name) have read and know the commitment in this program.

I _____ (Parent Name) have read and know the commitment of my student in this program.