

- ✓ **UC Approved Electives**
- ✓ **College Credit Available**
- ✓ **State of the art computers**
- ✓ **Industry Standard Software**
- ✓ **Haas CNC Mill**
- ✓ **Shopbot CNC Router**
- ✓ **Three 3d printers**
- ✓ **Laser Engraver / Cutter**
- ✓ **A WHOLE LOT OF FUN**

### Coffee Table Game Project

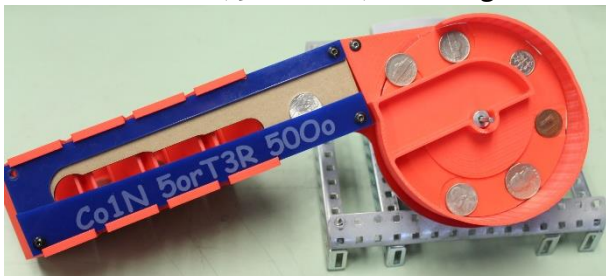
Tools Used: Solidworks, 3D Printer, CNC Router



Solidworks CAD Drawing    Student Made Game

### Robotic Coin Sorter

Tools Used: AutoCAD, Solidworks, RobotC, VEX Robots, 3D Printer, Laser Engraver



PLTW Engineering empowers students to step into the role of an engineer, adopt a problem-solving mindset, and make the leap from dreamers to doers. The program's courses engage students in compelling, real-world challenges that help them become better collaborators and thinkers. Students take from the courses in-demand knowledge and skills they will use in high school and for the rest of their lives, on any career path they take. Find out more at [www.pltw.org](http://www.pltw.org)

### **MVHS Student Testimonials:**

"I took all four of Mr. Bradley's classes which really helped me decide to pursue Civil Engineering. The classes are approached with a hands on learning style that benefited me because Cal Poly Pomona's motto is "learn by doing". Some of the most important aspects from the classes that have helped me today were keeping an engineering notebook, learning AutoCAD, and working on a team for the robotics competitions. Mr. Bradley's classes give you a great taste of what it is like to do something in the STEM field."

*Kristina*

Civil Engineering student at Cal Poly Pomona

"Mr. Bradley's STEM program helped me to learn valuable skills in both the field of engineering as well as skills that can be applied in the real world. I took all of the classes he teaches in addition to four years in the robotics club. I now work for Kia Design of Irvine and use many of the hands on skills and computer aided drafting techniques I learned in Mr. Bradley's program every day. I was able to transition to this job straight from high school because of the exceptional program Mr. Bradley has established at Murrieta Valley High School."

*Bryce*

Kia Design of Irvine

"The Robotics class and club were critical in my preparation for a Mechanical Engineering major at Cal Poly SLO. The design tools and concepts utilized in these groups helped give me a significant boost in practical design skills, which helped me succeed in college and in my professional career in R&D."

*Eric*

Master's Degree in Mechanical Engineering Cal Poly San Luis Obispo  
Research and Development Engineer

## Course Pathway

### Freshman

Intro to Design

### Sophomore

Computer Integrated Manufacturing (CIM)

### Junior

Robotics I

### Senior

Robotics II

### Contact Info

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951-696-1408 x5822

### Teacher Website

### Robotics Club Website

[www.team569.com](http://www.team569.com)

### It's My School YouTube Video about NHRC

<https://www.youtube.com/watch?v=cwTaLsUwHHk>

# Intro to Design (Engineering)

UC Approved "F" Elective

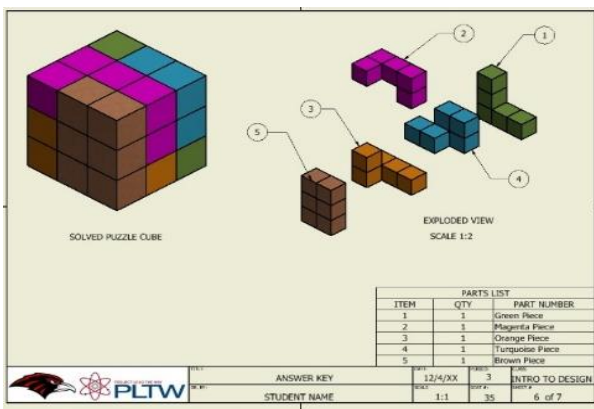
Meets Visual Performing Arts Credit

3 Units of College Credit through RCC

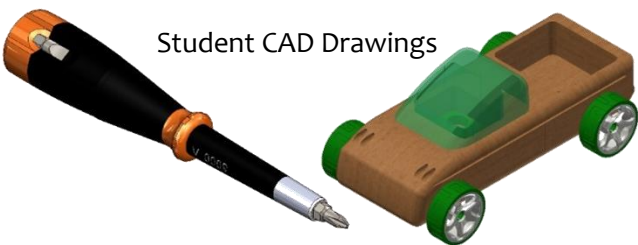
**Introduction to Design** is the first course in the Project Lead the Way Engineering sequence at MVHS. This course exposes students to the elements and principles of visual design using the engineering design process. Projects will focus on design factors such as aesthetics, format, geometric shape and form, perspective drawing, scale, proportion, and presentation techniques. Students will use computers as a medium/tool for design of project components such as sketching techniques, orthographic drawing, 3D modeling and rendering. Through hands-on projects, students will apply engineering standards while documenting their work and designs in an engineer's notebook. Students will design solutions to numerous proposed problems and communicate these solutions to peers and faculty. The course assumes no previous knowledge, but students should be concurrently enrolled in appropriate mathematics and science courses.

## Course Outline:

1. Design Process
2. Technical Sketching & Drawing
3. Measurement and Statistics
4. 3D Modeling
5. Geometric Shapes and Solids
6. Reverse Engineering
7. Documentation
8. Advanced 3D Modeling
9. Design Teams
10. Design Challenges



Student CAD Drawings



# Computer Integrated Manufacturing

UC Approved "G" Elective

**Computer Integrated Manufacturing (CIM)** is the second course in the Project Lead the Way Engineering sequence at MVHS. CIM is considered a specialty course and will focus on the high-tech, innovative nature of modern manufacturing. CIM focuses on the fundamentals of computerized manufacturing, automation technologies, product design, and robotics. CIM builds on the solid-modeling skills developed in the Introduction to Design course. Students will use 3-D design software, CAM (Computer-Aided Manufacturing) software, CNC (Computer Numeric Control) machinery, and robotics, to solve multiple design, manufacturing, and automation problems. Through hands-on projects, students will apply engineering standards while documenting their work and designs in an engineer's notebook. Students will design solutions to solve proposed problems and communicate solutions to peers and members of the professional community. The course assumes a solid understanding of topics covered in the Introduction to Design course and will further develop Computer Aided Design skills as tangible projects are produced on CNC machinery.

## Course Outline:

1. Principles of Manufacturing
2. Manufacturing Process
3. Elements of Automation
4. Integration of Manufacturing

## Course Tools:

- ✘ Haas TM1P CNC Mill
- ✘ Shopbot CNC Router
- ✘ Three 3D Printers
- ✘ Laser Engraver/Cutter
- ✘ VEX Robots
- ✘ Lynxmotion Robots
- ✘ Autodesk Inventor CAD Software
- ✘ HSM Pro CAM Software



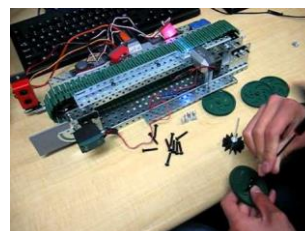
Haas CNC Mill



PLTW  
Lynxmotion Robots



Shopbot CNC Router



VEX Robots

# Robotics I & II

UC Approved "G" Elective (Robotics I only)

**Robotics I** will continue to explore the relationships between Science, Technology, Engineering, and Math. This course further builds on the robotics foundation that students explored during CIM. Students will use VEX Robotics, RobotC, as well as other various platforms including but not limited to Parallax, Rasberry Pi, Arduino, and VEX IQ to explore basic and advanced robotics concepts. Course information will be tied to lab experiments where students will work in teams to build and test complex robots to perform various tasks. Included in this instruction will be the historical development of robotics as a field, the importance of integrating sensors, effectors and control, basic control, the key approaches to mobile robot control (reactive, behavior-based, and hybrid), and discussion of robot learning and multi-robot systems history. Students may also work on a robotics team that competes against other high schools in the annual VEX Robotics Competitions.

**Robotics II** is solely for students who want to design, build, and program robots to compete against other schools. Students will work on one of our four VEX Robotics Competition Teams to compete against over 10,000 registered VEX teams from around the world. Integrated throughout the course are career preparation standards which include basic academic skills, communicating individual and team ideas, interpersonal skills, problem solving abilities, safety, technology, and employment literacy.

## Fun Facts About the NightHawk Robotics Club (NHRC)

- ✘ Established in 2006
- ✘ Team # 569
- ✘ Currently 4 Separate Teams (569A, 569B, 569C, 569D)
- ✘ Over 60 members
- ✘ Qualified for World Championship Every Year
- ✘ Won World Championship in 2012
- ✘ Won CA State Championship 2015
- ✘ State Championship Finalist 2016
- ✘ World Championship Division Finalist 2016

## Competition Robots

