

**MVLA
2026-27
COURSE INFORMATION SHEET**

Course Title: Engineering II

CTE Pathway Sequence: Engineering Technology

School: Mountain View High School

UC/CSU requirement: Approved as UC 'D' Science Credit

MVLA Graduation Requirement: No

Textbook and/or other learning resources: No required text, supplemental materials will be provided

General Course Description/Student Learning Outcomes:

In this second year course, students build on their computer modeling skills with OnShape to design and create mechanical systems. Students will push beyond the fundamentals of mechanical engineering while using CAD assemblies as their primary communication tool. Mechanical designs will allow for the investigation and application of applied physics concepts such as mechanical advantage and torque versus speed relationships. Students will learn how to power motion using motors and robotics electronics as well as apply basic programming to control their mechanical systems. Students will also learn how to apply statistical analysis to designs in order to objectively characterize performance and guide future design iterations using evidence to support design decisions. Students will add to an existing digital design portfolio to showcase their major projects, and will use a personal notebook to document and communicate daily work.

Course Outline/Units of Study/CTE Industry Standards

Units of Study ([Engineering and Architecture - Engineering Technology](#))

1. Motion Systems (B1.0, B4.0, B5.0, & B6.0)
 - a. CAD and Mass Related Parameters
 - b. CAD design process and Force Related Variables
 - c. Simple machines: Levers and Pulleys
 - d. Mechanical advantage
2. Wheel and Axle and Powering Motion (B3.0, B7.0, B8.0, B10.0)
 - a. Diodes, Ohms Law, and Motor Controllers
 - b. Ultra Sonic Sonar
 - c. Axle Fabrication
 - d. Batteries and Motors
 - e. Autonomous Vehicle Design
3. Gears and Sprockets and Transferring Force (B5.0, B6.0, B7.0, B8.0)
 - a. Gears and Sprockets
 - b. Specialty Gears
 - c. Gear Boxes
 - d. Transmissions. Two Speed Transmission Challenge
 - e. Autonomous Vehicles Challenge
4. Powering Motion (B1.0, B3.0 & B6.0)
 - a. Simple circuits
 - b. Servos and Joysticks, Robotics Arm Design
 - c. Laser Cutting, 3D Printing, Fabrication, and Robotic Arm Prototype
 - d. Robotic Arm Challenge
5. Flight and Drones (B3.0, B4.0, B8.0)
 - a. Brushless Motors
 - b. Telemetry
 - c. Physics of Flight
 - d. Helicopters and QuadCopters
 - e. Drone Design and Testing
 - f. Drone Challenge
6. Q4 Capstone (B10.0)
7. Creating and maintaining a digital portfolio (B1.0, B11.0)

Assessment and Grading ([BP 5121](#) / [AR 5121](#)): To ensure that every student has an equal opportunity to demonstrate their learning, the course instructors implement aligned grading practices and common assessments with the same frequency.

1. Grading categories and their percentage weights:

Projects 50%
Quizzes: 20%
Classwork: 20%
Portfolio: 10%

2. Achievement evidence collected within each grading category:

Projects: Each unit includes multiple minor projects and one to two major projects that require students to demonstrate understanding and apply the skills and concepts they learn throughout the unit. These assignments are typically hands-on design challenges and often build upon all prior knowledge within the course.

Quizzes: Quizzes will accompany the supplementary reading or viewing material over key concepts.

Classwork: In-class assignments will be given for each section. Many of these assignments will be in the form of group investigations, presentations, or practice problems to deepen the mathematical concepts that define various engineering principles.

Portfolio: Major unit projects will be documented in each student's digital portfolio using Google Sites. Some students may have a digital portfolio already from a course they took last year and will add to it to help document their developing abilities in engineering. Otherwise, students will create their portfolio towards the beginning of the year.

3. Grading scales:

A 90 to 100%
B 80 to 90%
C 70 to 80%
D 60 to 70%
F below 60%

Classwork/Project scale:

4 – Exceeding Understanding
3 – Meeting Understanding
2 – Approaching Understanding
1 – Minimal Understanding
0 – No Understanding Evident

4. Homework/outside of class practices ([AR 6154](#)):

Students will be expected to complete all classwork on a daily basis. Classwork includes in-class individual assignments, homework, and group assignments, or projects. All homework must be completed prior to the next class period. Each section of a unit may have a minor project where students are asked to demonstrate their understanding of the classwork through a practical and often hands-on design challenge. Each unit also has a major project that requires demonstration of understanding through a culmination of all skills and concepts from the unit and the prior units. Therefore staying caught up on classwork assignments is essential to success in this class.

5. Excused absence make up practices ([Education Code 48205\(b\)](#)):

Students with excused absences will give additional days (the same amount as they were absent) to make up missed assignments for full credit.

6. Academic integrity violation practices ([MVHS Academic Integrity Policy](#)):

7. Generative Artificial Intelligence (AI) Use:

By default, GenAI is not to be used on assignments or assessments.

If/when GenAI is allowed, the teacher will explain the level and type of GenAI use permitted for that assignment.

Using GenAI in a way that does not follow the assignment directions, turning in AI-generated work as your own, or not disclosing GenAI use when required may be considered an academic integrity violation.

8. Late work practices:

All work is required to be submitted by the project/assignment end date. Any exceptions need to be pre-arranged with the teacher.

9. Revision practices:

This is primarily a project-based and experiential learning class. Projects are completed over multiple class periods which provide ample time for check in and guidance. Therefore revision is not generally required or

available in this class but can be arranged with the teacher in extreme circumstances.

10. Extra credit practices:

Extra credit will not be granted in this course.

11. Additional grading practices:

Some of the work completed in this class, often larger projects, will be done in groups of 2-3. Students will be assessed according to the group's final product, as well as their individual contributions. On all classwork assignments and even when working on group projects, students are never allowed to submit work "as a group" and must submit their own individually completed assignments.

12. Learning Management System (LMS) used: Canvas

Instructors' email address:

Pat Murphy: patrick.murphy@mvla.net

Additional information:

All notes and Slide Decks will be posted in Canvas. Students are expected to check Canvas daily for notifications, participate during class, and maintain respectful and appropriate behavior.