



Civil Engineering and Architecture 2025-2026

Updated: August 12, 2025

Contact Information

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WHAT IS PROJECT LEAD THE WAY (PLTW) ENGINEERING?

PLTW Engineering teaches students that real-world problems often have multiple solutions with many pathways to achieve success. With engaging courses like environmental sustainability, civil engineering and architecture, digital electronics, and aerospace engineering, you can empower your students to explore possibilities, experiment, learn from failure, and turn ideas into reality. PLTW Engineering encourages students to adopt a problem-solving mindset, engaging them in compelling, real-world challenges that help them become better collaborators and thinkers.

COURSE DESCRIPTION

Civil Engineering and Architecture (CEA) is a high school level specialization course in the PLTW Engineering Program. In CEA students are introduced to important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architectural design software. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students will progress from completing structured activities to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.

COURSE ACTIVITIES

Below you will find descriptions of the most common activities that students will participate in during the course of each semester. **Throughout the year, ALL students will:**

- Solve problems as they practice common design and development protocols such as project management and peer review through both individual and collaborative team activities and projects
- Develop skill in engineering calculations, technical representation and documentation of design solutions according to accepted technical standards, and use of current 3D architectural design and modeling software to represent and communicate solutions

GRADES - Click here for → [YWLA Grading Policy](#)

Major (Exams, Projects, Activities, Presentations) 60%

Minor (Daily Work, Quiz, Homework, Engineering Notebook) 40%

CLASSROOM RESOURCES

- **Google Classroom:** <https://classroom.google.com/> code: **6bdibn4q**
- **Engineering Notebook and Laptop (provided)**

COURSE OUTLINE (full Course Outline found [here](#))

| Lesson | Topic Description | % of Days |
|--------|--|-----------|
| Unit 1 | Overview of Civil Engineering and Architecture | 14 |
| 1.1 | History of Civil Engineering and Architecture | |
| 1.2 | Careers in Civil Engineering and Architecture | |
| Unit 2 | Residential Design | 33 |
| 2.1 | Building Design and Construction | |
| 2.2 | Cost and Efficiency Analysis | |
| 2.3 | Residential Design | |
| Unit 3 | Commercial Applications | 34 |
| 3.1 | Commercial Building Systems | |
| 3.2 | Structures | |
| 3.3 | Service and Utilities | |
| 3.4 | Site Considerations | |
| Unit 4 | Commercial Building Systems | 19 |
| 4.1 | Commercial Building Design Problem | |
| 4.2 | Commercial Building Design Presentation | |

ADDITIONAL INFORMATION:

- This class will adhere to the YWLA Grading Policy. Please ensure that you read and understand the policy.
- Feedback will be provided on your assignments and is an important part of the learning process. You will be able to learn from your mistakes and make improvements so that you may be successful in this course.
- The majority of the content will be delivered in-class. Please bring a charged Chromebook to class every day (or you may use the engineering laptops)
- Please adhere to the academic integrity policy found in the student handbook. All students are expected to complete their work individually, unless otherwise instructed.



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- The use of AI software (like ChatGPT) to gain an unfair advantage and/or to cheat is strictly prohibited.
- **Group Projects.** There will be some projects/assignments that will be assigned as group work and will be MANDATORY. On group projects, one grade will be given regardless of individual student participation/effort, with some exceptions. If there is a conflict within the group, each student must address it to Zubia personally within a reasonable amount of time. All students are expected to participate in class discussions. Please do not be the student that did not contribute to the group. Please do not hog the work; every student can contribute in one form or another.
- **Engineering Laptops/Equipment.** Each student will be assigned an engineering laptop with a number. Please follow the MISD Code of Conduct regarding computer usage. Any violation will result in privileges suspended. Food/Beverages are not permitted while using the laptop/equipment. Be careful with the engineering equipment! Do not break it! Sorry video gamers: students are not allowed to play computer games including, but not limited to: Minecraft, retro game emulation, or any other internet game.

Please feel free to reach out with any questions or concerns. We are excited to work together to make this a successful year of learning!

Mr. Zubia
