



# Project Lead The Way Engineering

Woodbridge Senior High School | 2019-20 School Year

Mr. Castro | Mr. DeFelice | Mrs. Hille

## Gradebook Set-up and Grading Procedures

On average, grades will be entered on a weekly basis and a score out of 100 percentage points will be awarded for each assignment. To learn more about how we are supporting our students with reporting academic progress, [view this video](#).

### Grades will be calculated based upon the following assessment categories:

**50% - Quizzes/Projects:** These assessments are a way for students to demonstrate that they have mastered learning target(s) that have been addressed during a unit of study. This type of assessment could occur during a unit or at the end of a unit. These assessments are often *high stakes*, which means that they have a high point value.

**40% - Activities:** These assessments is to *monitor student learning* to provide ongoing feedback towards a learning target that can be used by instructors to improve their teaching and by students to improve their learning.

**10% - Essential Questions / Progress Checks:** The goal of these assessments is to *monitor student learning* to provide ongoing feedback towards a learning target that can be used by instructors to improve their teaching and by students to improve their learning. These assessments are generally *low stakes*, which means that they have low or no point value.

The Prince William County Public Schools' grading scale will be used and is as follows:

A = 90-100%	C+ = 77-79%	D = 60-66%
B+ = 87-89%	C = 70-76%	F = 59% and below
B = 80-86%	D+ = 67-69%	

## Multiple Opportunities to Demonstrate Mastery

Students will be allowed to reassess quizzes. In order to do so, students must demonstrate that they have prepared for the reassessment by ensuring that they have submitted all related activities and skill practices associated with the quiz. In addition, the instructor may assign additional practice opportunities that they feel would better prepare the student for the reassessment.

## Late Work Policy

Late work will be accepted up to two weeks past the assigned due date published in ParentVUE and Google Classroom. In the event that the dates are not consistent, the later date will be used to determine

late work. Students will be given one week after the assignment is graded to re-submit the assignment if they wish to improve their grade but only if the original assignment was submitted on time. This policy applies only to activities and skills practices and not quizzes or projects.

Projects are a large summative assessment, comparable to a large unit test. As such, it is not possible to turn in projects late. Students will be given explicit timelines and guidelines for submission of such projects and must submit them on time.

## Attendance

Students who miss 10 or more classes, excused or unexcused, are at risk of failing and will be placed on No Credit Status.

## PLTW End-of-Course Assessment (EoC)

All students will take the summative End of Course Assessment as prescribed by Project Lead the Way regardless of their yearlong grade in the class. It will count as a summative grade for the fourth quarter and cannot be reassessed.

## Electronic Devices

All electronic devices are to be put away once entering the classroom. They are not to be in use during lessons, class discussions, quizzes, or tests. When devices are allowed to be used, they must be used for productive classwork, i.e. scanning, research, Google Classroom, or quietly working with headphones.

## Google Classroom

Google Classroom will be used as an extension of the classroom. Announcements will be regularly be updated for current unit of study and assessments dates. Assignments can be found here as well and a link to the notes on mypltw.org. Parents with a connected email can get regular email updates about their students. Students should be checking here regularly, especially when they are absent.

## Suggested Material

To be organized and successful in this class, it is suggested that you have the following materials: An engineering notebook (graph ruled and bound--cannot be removed and replaced easily), pencils with an eraser, and colored pens/pencils.

## Assessment Policy

If a student is absent for a quiz or test, then the student will complete the assessment in-class on the first day the student returns. It is the student's responsibility to make up the work and/or notes missed in class while absent and while taking the quiz. Assessment days will not change due to a student's absence.

## Communication

Email is the preferred method of communication for general student questions and parent questions. If any questions arise, please feel free to send an email. The email will be addressed within 24 hours of receipt. Students with questions on a specific assignment should use the comment section of that assignment on google classroom.

## Extra help

Teachers are available for extra help during flex periods or after school by appointment. Please contact your teacher directly via email or set up an appointment in class. If you are seeing a teacher for extra help, make sure you come with specific questions and concerns and bring all of the required materials.



## **Project Lead the Way Civil Engineering & Architecture (CEA) 2019 – 2020**

Mr. DeFelice

Room 1208

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Main Office: 703.497.8000

Twitter: @DeFelice\_WSHS

Woodbridge Website: <http://woodbridgehs.pwcs.edu/>

Project Lead the Way: <http://mypltw.org/>

Learning Management System: Google Classroom

### **Objectives:**

The major focus of the Civil Engineering and Architecture (CEA) course is a long-term project that involves the development of a local property site. As students learn about various aspects of civil engineering and architecture, they apply what they learn to the design and development of this property. The course provides freedom to the teacher and students to develop the property as a simulation or to students to model experiences that civil engineers and architects experience when developing property.

The CEA course is structured to enable all students to have a variety of experiences that will provide an overview of both fields. Students work individually and in teams exploring hands-on projects and activity to learn the characteristics of civil engineering and architecture. The following units will be explored in more detail throughout the year:

- Unit 1: Overview of Civil Engineering & Architecture
- Unit 2: Residential Design
- Unit 3: Commercial Applications
- Unit 4: Commercial Building Systems

In addition, students will use Autodesk Revit, which is a state of the art 3-D architectural design software package, to help them design solutions to solve class assignments and projects. Working in teams (and individually), students will learn about documenting their project, solving problems and communicating their solutions to various audiences.

## **Competencies:**

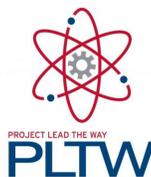
The competencies that will be covered this year can be accessed at the following website:  
<http://www.cteresource.org/verso/courses/8439/introduction-to-engineering-design-pltw-tasklist>

## **Learning Management System:**

As a part of the effort to provide content and support materials, this class will use two online resources called “Learning Management Systems” or LMS for short. The PLTW LMS includes course notes, PowerPoints, reference documents, and other resources. This is essentially an interactive online textbook. You will be required to log into this website frequently inside and outside of class. Google classroom will include assignments, schedules, due dates, quizzes, discussion board posts, and other resources. You will also be required to submit your work via Google classroom. It is imperative that you log into your Google account frequently to check for class updates and to submit assignments. I will update the site often in an effort to keep students and parents up to date in all the class happenings. Parents and students are encouraged to visit the site regularly to stay informed.



Google Classroom



## **Required Materials:**

Each student will be expected to purchase the following items that will be used every day in class.

- ✓ Engineering notebook (must be graph ruled and bound)
- ✓ Pencils (class notes and sketches)
- ✓ Pens (documentation in engineering notebook)
- ✓ Flash drive (4 GB minimum—document storage)

Students are responsible for keeping course documents, notes, projects, assignments, quizzes, and tests in their engineering notebooks and on their flash drives. Engineering notebooks can be stored safely in class and will be graded often. Flash drives should not be stored in class. It is highly recommended that a backup of your flash drive be created and updated throughout the year (monthly at a minimum). Loss of files is not an excuse for not submitting an assignment or submitting late. If you choose to take your engineering notebook or flash drive home they **MUST** return the next class period!

## **Student Requirements:**

Students will be required to have these materials and will be required to follow Prince William County School policies regarding student behavior. Computers will be used to complete projects and assignments. If the computers are abused or software is used for anything other than course related material, students will be given alternate assignments and disciplined accordingly.

### **Classroom Rules:**

1. When the instructor speaks, you are silent and you are listening.
2. Follow and abide by all rules and computer procedures outlined in the Prince William County Student Code of Behavior.
3. Follow the classroom routines.
4. Be prepared for class at all times. Have your materials ready for each class.
5. Act in a professional manner at all times. No profanity, no gum, no food or drinks.
6. Be respectful to all people, their belongings, and their projects at all times.

### **Contacting and Meeting with Mr. DeFelice:**

Block	Class	Room
1	Construction Technology	1419
2	Civil Engineering and Architecture (CEA)	1208
3	Introduction to Engineering Design (IED)	1208
4	Engineering Design and Development (EDD) Online (Potomac HS)	1208
5	Civil Engineering and Architecture (CEA)	1208
6	Engineering Design and Development (EDD)	1208
7	Planning	-

If you have any questions, concerns, or special needs, please do not hesitate to contact me via email or phone. I will be available before and after school for any possible meetings. My door is always open and I check my e-mail frequently. Let's have a GREAT year!

# **Civil Engineering & Architecture (PLTW)**

## **Learning Targets**

### **UNIT 1: OVERVIEW OF CIVIL ENGINEERING & ARCHITECTURE**

#### **Lesson 1.1: History of Civil Engineering & Architecture**

- 1.1.1.A I can connect modern structural and architectural designs to historical architectural and civil engineering achievements.
- 1.1.1.B I can identify three general categories of structural systems used in historical buildings.
- 1.1.1.C I can explain how historical innovations have contributed to the evolution of civil engineering and architecture.
- 1.1.2 I can identify and explain the application of principles and elements of design to architectural buildings.
- 1.1.3 I can determine architectural style through identification of building features, components, and materials.
- 1.1.4 I can create a mock-up model depicting an architectural style or feature using a variety of materials.

#### **Lesson 1.2: Careers in Civil Engineering & Architecture**

- 1.2.1.A I can identify the primary duties, and attributes of a civil engineer and an architect along with the traditional path for becoming a civil engineer or architect.
- 1.2.1.B I can identify various specialty disciplines associated with civil engineering.
- 1.2.2.A I can participate in a design charrette and recognize the value of using a charrette to develop innovative solutions to support whole building design.
- 1.2.2.B I can understand the relationship among the stakeholders involved in the design and construction of a building project.

### **UNIT 2: RESIDENTIAL DESIGN**

#### **Lesson 2.1: Building Design & Construction**

- 2.1.1 I can identify typical components of a residential framing system.
- 2.1.2.A I can identify conventional residential roof designs.
- 2.1.2.B I can model a common residential roof design and detail advantages and disadvantages of that style.
- 2.1.3 I can use 3D architectural software to design, model, and document a small building.

#### **Lesson 2.2: Cost and Efficiency Analysis**

- 2.2.1 I can apply basic math skills to calculate the quantity and cost of concrete needed to pour the pad for a small building.
- 2.2.2 I can create a cost estimate for a small construction project, including a detailed cost break-down.
- 2.2.3 I can calculate the heat loss for a building envelope with given conditions appropriate for the project.

#### **Lesson 2.3: Residential Design**

- 2.3.A I can choose an appropriate building location on a site based on orientation and other site-specific information.
- 2.3.B I can document the design of a home using 3D architectural design software and construction drawings.

- 2.3.1.A I can create a home design that complies with applicable codes and requirements.
- 2.3.1.B I can create bubble diagrams and sketch a floor plan.
- 2.3.2 I can incorporate sustainable building principles and universal design concepts into a residential design.
- 2.3.3 I can apply elements of good residential design to the design of a basic house to meet the needs of a client.
- 2.3.4 I can apply LEED principles into a residential design.
- 2.3.5 I can identify residential foundation types and choose an appropriate foundation for a residential application.
- 2.3.6 I can create sketches to document a preliminary electrical system layout for a residence that complies with applicable codes.
- 2.3.7 I can create a site opportunities map and sketch a project site.
- 2.3.8 I can calculate the head loss and estimate the water pressure for a given water supply system.
- 2.3.9 I can create sketches to document a preliminary plumbing system layout for a residence that complies with applicable codes.
- 2.3.10 I can design an appropriate sewer lateral for wastewater management for a building that complies with applicable codes.
- 2.3.11 I can calculate the storm water runoff from a site before and after development.

### **UNIT 3: COMMERCIAL APPLICATIONS**

#### **Lesson 3.1: Commercial Building Systems**

- 3.1.1.A I can use 3D architectural design software to incorporate revisions for the redesign of a building.
- 3.1.1.B I can use 3D architectural design software to create appropriate documentation to communicate a commercial building design.
- 3.1.2.A I can identify applicable building codes and regulations that apply to a given development.
- 3.1.2.B I can classify a building according to its use, occupancy, and construction type using the International Building Code.
- 3.1.2.C I can research Land Use regulations to identify zoning designations and allowable uses of property.
- 3.1.2.D I can comply with specifications, regulations, and codes during a design process.
- 3.1.3 I can compare a variety of commercial wall systems and select an appropriate system for a commercial application.
- 3.1.4.A I can compare a variety of commercial low-slope roof systems and select an appropriate system for a commercial application.
- 3.1.4.B I can identify the pros and cons of the use of a green roof in a commercial building design.
- 3.1.4.C I can incorporate a green roof into the design of a commercial building.
- 3.1.5 I can calculate the structural efficiency of a structure.
- 3.1.6.A I can compare commercial floor systems and select an appropriate system for a commercial application.
- 3.1.6.B I can use load-span tables to design structural elements.

#### **Lesson 3.2: Structures**

- 3.2.1 I can describe how a structural form resists and transfers applied loads.
- 3.2.2 I can use building codes and other resources to calculate roof loading to a structure and select appropriate roof beams to safely carry the load.

- 3.2.3 I can analyze a simply supported beam subjected to a given loading condition to determine reaction forces, sketch shear and moment diagrams, and determine the maximum moment resulting in the beam.
- 3.2.4 I can use beam formula to calculate end reactions and the maximum moments of a simply supported beam subjected to a given loading condition.
- 3.2.5 I can use structural analysis software to create shear and moment diagrams of simply supported beams subjected to a given loading condition.
- 3.2.6 I can calculate the deflection of a simply supported beam subjected to a given loading condition.
- 3.2.7 I can use building codes and other resources to determine the required floor loading and design a structural steel floor framing system (beams and girders) for a given building occupancy.
- 3.2.8 I can identify and describe the typical usage of foundation systems commonly used in commercial construction.
- 3.2.9 I can determine the loads transferred from a steel framed structure to the ground through a foundation.
- 3.2.10 I can size a spread footing for a given loading condition.
- 3.2.11 I can check structural calculations created by others for correctness.

### **Lesson 3.3: Services and Utilities**

- 3.3.1 I can identify typical utility services for a commercial building, typical transmission/distribution methods for each utility, and methods for measuring usage.
- 3.3.2 I can interpret and apply code requirements and constraints as they pertain to the installation of services and utilities.
- 3.3.3 I can read and understand HVAC construction drawings for a commercial project.
- 3.3.4 I can apply criteria and constraints to size and locate the new utility service connections for a commercial facility.
- 3.3.5 I can modify system designs to incorporate energy conservation techniques.

### **Lesson 3.4: Site Construction**

- 3.4.1 I can use differential leveling to complete a control survey to establish a point of known elevation for a project.
- 3.4.2 I can design appropriate pedestrian access, vehicular access, and a parking lot for a commercial facility.
- 3.4.3 I can analyze a site soil sample to determine the United Soil Classification System designation and predict soil characteristics important to the design and construction of a building on the site.
- 3.4.4 I can explain the impact of site development on storm water runoff.
- 3.4.5 I can estimate the increase in storm water runoff from a commercial site and create a preliminary design for a storm water storage facility.
- 3.4.6 I can identify and explain the purpose of Low Impact Development techniques in site development.
- 3.4.7 I can apply Low Impact Development techniques to a commercial site design reduce the impact of development on storm water runoff quantity and quality.
- 3.4.8 I can follow specifications and codes during a design process.
- 3.4.9 I can document a commercial site design, given 3D architectural design software.

## **UNIT 4: COMMERCIAL BUILDING DESIGN**

### **Lesson 4.1: Commercial Building Design Problem**

- 4.1.1 I can work individually and in groups to produce a solution to a team project.
- 4.1.1.a.I can research codes, zoning ordinances and regulations to determine the applicable requirements for a project.
- 4.1.2 I can identify the boundaries of a property based on its legal description.
- 4.1.3 I can perform research and visit a site to gather information pertinent to the viability of a project on the site.
- 4.1.4 I can identify the criteria and constraints and gather information to promote viable decisions regarding the development of their solution.
- 4.1.5 I can create an architectural program, a project organization chart, and a Gantt chart and hold project progress meetings to help manage the team project.
- 4.1.6 I can communicate ideas while developing a project using various drawing methods, sketches, graphics, or other media collected and documented.
- 4.1.7 I can identify the criteria for commercial property/project viability.
- 4.1.8 I can investigate the legal, physical, and financial requirements of a project and consider the needs of the community to determine project viability.
- 4.1.9 I can apply current common practices utilized in Civil Engineering and Architecture to develop a viable solution in their project.
- 4.1.10 I can develop an understanding of how software is used as a tool to aid in the solution and then the communication of a project.

### **Lesson 4.2: Commercial Building Design Presentation**

- 4.2.1 I can assemble and organize work from a commercial project to showcase the project in an effective and professional manner.
- 4.2.2 I can create visual aids for a presentation that include the appropriate drawings, renderings, models, documentation, and the rationale for choosing the proposal for project development.
- 4.2.3 I can conduct an oral presentation to present a proposal for the design and development of a commercial building project.

## Take a photo of this portion and upload to Google Classroom!

- We have read and understood Mr. DeFelice's PLTW Civil Engineering & Architecture syllabus and classroom expectations and will work together to make this a successful and exciting year.
- We understand that our student will be issued lab supplies and tools to perform many of the hands on assignments and that it will be his/her responsibility to treat all materials with proper respect.
- We understand that students may be asked to find and/or purchase materials to bring in to use with their projects and that every effort will be made to minimize the cost and impact to the student.
- We understand that our student will need to be ready to start participating in the class by the second meeting of the class. As such he/she will need to have the materials outlined in class.
- We understand that safety is of primary importance and expect our student to respect and comply with Mr. DeFelice's instructions.
- We understand that cell phones and other personal devices will be allowed if they are used to scan images from an engineering notebooks and to take pictures of projects to incorporate in assignments to submit for grading. There will be no use of such devices during lecture times.

**I certify that I have read and understand the information stated above and I will direct any questions I have to Mr. DeFelice.**

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Student signature	Print name	Block
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Parent/Guardian signature	Print name	Date
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Parent/Guardian email	Daytime phone	Evening phone
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**Welcome to another great year at Woodbridge Senior High School!**