

# Project Lead the Way: Intro to Engineering Design

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## Welcome!!!

Project Lead the Way is a nation-wide engineering education program. During this first year of PLTW at El Rancho High School, you will focus on Computer Aided Design using Autodesk Inventor (Auto CAD is used by students studying Engineering and some Engineering fields). This course is the first of 4 courses that will be offered at El Rancho and introduces the engineering design process that will help you understand the important role engineers play in society. Nearly everything we see and touch each day – from cell phones to hybrid electric cars to toasters – has been created by an engineer. PLTW offers the opportunity to discover more about this exciting career path and is a stepping stone for students seeking to pursue an Engineering career or degree. As part of this class, you will be asked to maintain an organized notebook, bring required materials, and complete projects at school, online and/or at home. Once again...this is a tremendous opportunity, and it will be a very fun year!

## Materials/Supplies Needed:

Class Engineering Notebook  
Your mypltw.org username and password (No textbook is required; curriculum is online)  
Your school email/google account

## Class/Lab Policy:

Every day you will be working on or around expensive computing and trade equipment. This requires a zero food/beverage policy. Also, any dereliction of duty or unsafe behavior in shop will result in a reduction of participation grade and/or loss of lab privileges. \*Excessive missing assignments and/or failing grades will result in losing the opportunity to participate in future PLTW courses.

## Course Description:

In IED students are introduced to the engineering profession and a common approach to the solution of engineering problems, an engineering design process. 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 Objective:

Through both individual and collaborative team activities, projects, and problems, students will problem solve as they practice common engineering design and development protocols such as project management and peer review. Students will develop skill in technical representation and documentation of design solutions according to accepted technical standards, and they will use current 3D design and modeling software to represent and communicate solutions. In addition the development of computational methods that are commonly used in engineering problem solving, including statistical analysis and mathematical modeling, are emphasized.

## Course Outline/Year at a Glance:

### 1<sup>st</sup> Semester

Design Process  
Technical Sketching & Drawing  
Measurements & Statistics  
Modeling Skills  
Geometry of Design

### 2<sup>nd</sup> Semester

Reverse Engineering  
Documentation  
Advanced Computer Modeling  
Design Team  
Design Challenges

## Grading Scale:

Range	Grade
100 – 93 %	A
92 – 90 %	A-
89 – 87 %	B+
86 – 83 %	B
82 – 80 %	B-
79 – 77 %	C+

76 – 73 %	C
72 – 70 %	C-
69 – 67 %	D+
66 – 63 %	D
63 – 60 %	D-
Below 60 %	F

Performance	10%
Activities/Notebook	60%
Assessments/Presentations	30%

**Come to class every day and be on time**

**Work not finished in class is HOMEWORK!**

**Grades are updated every day. You can always check your grade online.**

**A-G Art Credit for ERHS**

**College Credit through Cerritos College with B or higher**

**Competency and Skill Expectations (when students finish this class they should be able to):**

- Describe various engineering careers and understanding of safety practices and standards
- Identify the design process and tasks performed at each step (Design Briefs, Design Constraints, Prototype)
- Work as a team member in a diverse environment to equitably delegate responsibility in a design project (Identify the problem, plan, and allocate resources, create hand sketches, CAD design and/or physical model)
- Demonstrate ability to solve various engineering design problems and utilize formula sheets to make calculations (Volume, Dimensions, Area, Conversions, Circumference, Perimeter, Statistics)
- Reverse Engineer a product and apply sketching techniques to demonstrate ability to use Autodesk Inventor to generate 3D Model Parts, Dimensioned Multiview Drawings, Assemblies, and Explosion Views
- Demonstrate proper use of engineering hardware and software (scales, calipers, rulers, measuring tape, Autodesk Inventor, Excel)
- Effectively communicate in writing and through verbal presentations (Powerpoint, Google Slides, Prezi)
- Use internet to search safety and environmental codes and specifications of components
- Interpret technical industry design drawings to formulate a 3D model demonstrating Autodesk Inventor features (drawing constraints, dimensions, hole features, extrusions)