

Introduction to Engineering Design Course Resumes

Course resumes showcase the technical skills students obtain in each PLTW course. Each resume outlines the computational skills, analytical skills, and knowledge acquired in the course. Course Resumes also detail student experience with tools, software, lab work, and engineering design. The detailed skills listed within course resumes illustrate the immediate, applicable contributions that students can make within a workplace.

CAD and Drafting Experience

- Create and/or modify 3D solid computer models of complex parts
- Create 3D models of part assemblies
- Create technical drawings of complex parts and assemblies from 3D solid models using CAD software
- Apply drive constraints and simulate motion of an assembly within the 3D modeling environment
- Create concept sketches to represent ideas
- Create hand drawn technical drawings to represent a simple part that may include an isometric view, orthographic projections and a section view

Design Process Experience

- Design a consumer product using an engineering design process based on a design brief
- Solve a problem using an engineering design process
- Document in detail the engineering design process used to solve a problem or design a product
- Create a detailed and comprehensive design brief
- Brainstorm/recommend improvements to a product based on reverse engineering
- Produce a detailed technical report to present the solution to a problem or a product design
- Describe the lifecycle of a consumer product
- Work collaboratively on a design team to design a product or solve a problem

Computational and Analytical Skills

- Use Excel to calculate summary statistics and create histograms
- Use Excel to find a trend line (mathematical model) to represent data and interpret the model within the context of the data
- Complete multi-step engineering calculations
- Make predictions based on data
- Use data to inform decisions
- Perform precision measurement using a dial caliper

- Convert among and between SI and US Customary
- Calculate physical properties (surface area, volume, density) of simple 3D forms
- Determine a parametric equation that describes a relationship between two quantities

Professional Skills

- Team collaboration
- Project management
- Problem-solving
- Communication skills
- Presentation skills
- Technical writing

Tools and Software

- Microsoft Office (Excel, Word, PowerPoint)
- 3D solid modeling software - Autodesk Inventor
- Dial calipers

Course Knowledge

Careers

- Engineering disciplines
- STEM careers related to engineering
- Professional ethics

Design Process

- Define the problem – design brief
- Generate concepts – brainstorming and decision matrices
- Develop a solution – technical drawing
- Construct and test a prototype
- Evaluate a solution
- Present a solution
- Product life cycle
- Design teams

Technical Sketching and Drawing

- Isometric views
- Perspective views

- Orthographic projections
- Section views

Measurement

- Linear measurement
- Unit conversion
- Precision and Accuracy
- Dimensioning
- Tolerance, fit and allowance
- Physical property analysis

Statistics

- Measures of central tendency
- Measures of variation
- Histograms
- Normal Distribution
- Sample versus population statistics
- The Empirical Rule (65-95-99 Rule)

Modeling in Engineering

- Graphical modeling
- Mathematical modeling
- Computer 3D solid modeling
- Physical modeling and prototyping