
Civil Engineering and Architecture Course Description

Civil Engineering and Architecture is the study of the design and construction of residential and commercial building projects. The course includes an introduction to many of the varied factors involved in building design and construction including building components and systems, structural design, storm water management, site design, utilities and services, cost estimation, energy efficiency, and careers in the design and construction industry.

The major focus of the CEA course is to expose students to the design and construction of residential and commercial building projects, design teams and teamwork, communication methods, engineering standards, and technical documentation.

Utilizing the activity-project-problem-based (APPB) teaching and learning pedagogy, students will analyze, design and build electronic and physical models of residential and commercial facilities. While implementing these designs students will continually hone their interpersonal skills, creative abilities and understanding of the design process.

Civil Engineering and Architecture is a high school level course that is appropriate for 10th or 11th grade students interested in careers related to civil engineering and architecture. Other than their concurrent enrollment in college preparatory mathematics and science courses, this course assumes no previous knowledge.

Civil Engineering and Architecture is one of four specialization courses in the Project Lead The Way[®] high school pre-engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

The course of study includes:

- Overview of Civil Engineering and Architecture
 - History of Civil Engineering and Architecture
 - Past Civil Engineering and Architecture
 - Principles and Elements of Design
 - Architectural Styles
 - Careers in Civil Engineering and Architecture
- Residential Design
 - Building Design and Construction practices
 - Building codes
 - Building components
 - Green technology
 - Universal Design
 - 3D architectural software
 - Design and construction documentation
 - Cost Analysis
 - Energy Efficiency
 - Storm water analysis
 - Water supply
 - Plumbing
 - Electrical Systems
 - Wastewater management
 - Affordable housing design
 - Universal design

- Commercial Applications
 - Commercial Buildings
 - Building codes
 - Land Use and Development
 - Commercial building components
 - Structural design
 - Structural Design
 - Steel deck
 - Precast concrete floors
 - Steel joints
 - Structural steel beams
 - Spread footings
 - Services and Utilities
 - Energy Codes
 - Plumbing (Optional)
 - Electrical systems (Optional)
 - Heating, Ventilating and Air-Conditioning systems
 - Wastewater management
 - Site Considerations
 - Land surveying
 - Soil analysis
 - Road design (Optional)
 - Parking lot design
 - Storm water management
 - Site grading (Optional)
 - Low impact development

- Commercial Building Design
 - Commercial Building Design Project
 - Property description
 - Site discovery
 - Commercial project viability
 - Project management
 - Commercial Building Design Presentation