



Civil Engineering and Architecture (CEA)

Instructor: Justin Robinson
Email: justin.robinson@beaufort.k12.sc.us
Website: www.robinsonlearning.com

Room: Computer Lab 2101

PROJECT LEAD THE WAY

Project lead the way is a series of courses which introduce students to the scope, rigor, and discipline of engineering and engineering technology prior to entering college. Introduction at this level will attract more students to engineering, and will allow students, while still in high school, to determine if engineering is the career they desire. Students participating in PLTW courses are better prepared for college engineering programs and are more likely to be successful, thus reducing the attrition rate in these college programs, which currently exceeds 50% nationally. For more information about the program please go to www.PLTW.org

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 and site 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 practices of residential and commercial building projects, design teams and teamwork, communication methods, building codes and ordinances, engineering design calculations, and technical documentation. Problem solving skills and design experience are gained through an activity-project-problem-based (APPB) teaching and learning pedagogy. Used in combination with a teaming approach, APPB-learning challenges students to continually hone their interpersonal skills and creative abilities while applying math, science, and technology knowledge learned in other courses to solve design problems and communicate their solutions.

Students will use industry standard 3D architectural modeling software to facilitate site and building design and technical documentation. As the course progresses and the complexity of the design problems increase, students will learn more advanced computer modeling skills as they become more independent in their learning, more professional in their collaboration and communication, and more experienced in problem solving and design.

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. No previous knowledge is assumed, but students should be concurrently enrolled in college preparatory mathematics and science courses in order to facilitate the use and understanding of appropriate math and science concepts necessary for the successful completion of CEA coursework.

Civil Engineering and Architecture is one of the 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.

See Course of Study on next page:

Overview of Civil Engineering and Architecture

Course of Study:

- 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 and LEED
 - Universal Design
 - Affordable housing design
 - Site plans
- Cost estimates
- Energy efficiency
- Storm water analysis
- Water supply
- Plumbing
- Electrical systems
- Wastewater management
- Design and construction documentation
- 3D architectural software

Commercial Applications

- Commercial Buildings
 - Building codes
 - Land Use and Development
 - Commercial building components
- 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

Required Supplies:

- Engineering Notebook (Graph Paper Composition Notebook)
- Mechanical Pencils (0.5 and 0.7)
- Flash Drive (at least 4GB)
- Plenty of graph paper

Computer Hardware/Software use

- The computers are the property of the school district and are intended for student instruction, not personal use.
- Students will be assigned a computer and be responsible for its use during the class period.
- Treat computers with care and respect. They are for **your** use.
- Report any problems to teacher if/when they arise.
- Do not shut down a computer unless instructed by teacher to do so.
- Do not misuse computer hardware and software such as sending out unauthorized messages, vandalizing equipment, altering a software program, playing games, plagiarism, etc.
- Do not download **anything** to a school computer (games, programs, etc.).
- Use the Internet for appropriate school related activity.
- Do not change desktop screen.

Classroom Expectations:

- Students are to be in class before the tardy bell rings.
- Students are to be prepared each day with the necessary materials.
- Students are to be attentive, involved and organized in class.
- Drawing assignments and notes MUST be done in pencil.
- Do not converse without permission.
- Treat everyone with consideration and respect. Disruptive behavior will not be tolerated.
- Students will not leave the class without teacher permission.
- Safety rules are to be followed at all times.
- **No food or drink during class.**

Students are to follow ALL school rules as outlined in the student handbook in your agenda books.

Tardy Policy: Students must be **IN** the classroom before the tardy bell rings. Only an administrator or I may excuse you from class, NO EXCEPTIONS!

Discipline Policy:

Disciplinary rules are outlined in the student handbook. Students will be verbally warned the first time that a rule is broken. The parent(s) will be called if the behavior persists. A referral will be written as a last resort or for any major infraction.

Grading:

Your assignments will be given a point total and your quarter grade will be based on the total number of points you achieve on tests, quizzes, and daily work. Typical, but not all, assignment breakdown of Points will be as follows:

Summative Assessments: 60% (examples: major projects, test, etc.)

Formative Assessments: 40% (examples: daily assignments, quizzes, small projects, etc.)

Final Grade:

Your final grade will be calculated as follows:

Course Grade: Semester1 50% Semester2 50%