

Rationale

In today's world, many people are involved in the design and development of the products, services, and environments in which we live. Civil Engineering and Architecture (CEA) have the greatest influence on our world. The civil engineer is responsible for structural design, utility connections, drawings and specifications, site design and construction management. The architect is responsible for building and space layout, design, ergonomics, style, and the way the building relates to its environment.

There is a tremendous need for qualified students who are proficiently prepared in our nation's college/university engineering and engineering technology programs. Only 28% of students who enter an engineering program in college finish their degree program. The CEA course is intended to serve as a specialization course within the PLTW sequence and with this specialized training the rate of successful completion of a engineering or engineering technology degree program increases to over 50%.

Course Description

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 the student learns 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 student to develop the property as a simulation or to model the real-world experiences that civil engineers and architects experience when developing property.

In addition, the student will use Rivet, which is a state of the art 3D design software package to design solutions to solve their major course project. The student learns about documenting their project, solving problems, and communicating their solutions to their peers and members of the professional community of civil engineering and architecture.

Prerequisites

Principles of Engineering (POE) with a "C" or higher and concurrently enrolled in Algebra II or higher

Credit: 1 Unit - Two Semesters (Practical Arts)

Weighted: 0.75

Course Objectives

1. The student will research, identify and discover the similarities and differences between civil engineering and architecture with 80% accuracy. (CA3, SS2, SS4, SC8; 1.2, 1.5, 3.1, 3.2) Locally assessed. (A+: Research)
2. The student will define and use basic terminology related to civil engineering and architecture with 80% accuracy. (CA3; 1.2, 3.5) Locally assessed.
3. The student will communicate and present information, i.e., sketches, graphs, charts, written reports, power point, 3D drawings, and oral presentations to effectively promote the project with 80% accuracy. (CA3, CA5; 2.1) Locally assessed. (A+: Writing)
4. The student will evaluate and articulate the ideas of design, components of a project, expectations, and to what is meant by design and development with 80% accuracy. (CA5; 3.4) Locally assessed.
5. The student will give an oral presentation articulating the steps of project planning and the topics of site discovery, regulations, and viability analysis with 80% accuracy. (CA1; 2.4) (A+: Speaking)
6. The student will communicate and articulate site planning to maximize potential of the property, minimize impact on the environment, and create an attractive visual space while following the codes and building requirements that define and constrain the location of structures, utilities, and landscape components placed on a site with 80% accuracy. (CA3; 3.4) Locally assessed
7. After reading various literature and books, the student will evaluate the various architectural styles and the many factors that a responsible designer takes into consideration such as; environment, aesthetics, structural integrity, safety and needs of the occupants, cost consideration and functionality, graphic communication of a design project, floor plans, energy systems, elevations, sections and details, schedules, mechanical systems, electrical systems, and protection systems with 80% accuracy. (CA3; 1.5) Locally assessed (A+: Reading)
8. The student will demonstrate the concepts of structural design and engineering as it relates to calculating structural designs and load calculations as they use roof systems, roof trusses, columns and beams, and foundations with 80% accuracy. (CA6, SC; 1.4, 3.5) Locally assessed.

BOE 11-6-14

Civil Engineering and Architecture(CEA)PLTW

Mehlville School District
STEM
Grades 11 - 12, Duration 1 Year, 1 Credit