Course Title
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.

Desired Results (Stage 1)

Established Competencies

Students will be able to…

1. Develop a portfolio to organize and display evidence of their work.
2. Use 3D architectural software to create and document the design of a home.
3. Differentiate between the fields of civil engineering and architecture.
4. Recognize and apply mathematics in contexts outside of mathematics.
5. Apply and adapt a variety of appropriate mathematical strategies to solve problems.
6. Create sketches to document a preliminary design plans.
7. Research codes, zoning ordinances and regulations to determine the applicable requirements for a project
8. Develop an understanding of and be able to select and use construction technologies.
9. Develop abilities to apply the design process to course activities and projects.

Acquisition

Students will know…

- The difference between civil engineering and architecture.
- How to apply the design process to civil engineering and architectural problems.
- How to use Autodesk Revit Architecture software.

Students will be skilled at…

- Critical Thinking
- Problem Solving
- Evaluating buildings and structures

Evidence (Stage 2)	
Evaluative Criteria	**Assessment Evidence**
Rubrics Test and Quizes	*Formative/Summative Assessments* *Homework* *Classroom Assignments* *Projects*

Course Title

Civil Engineering and Architecture

Unit 1: Overview of 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.

Desired Results (Stage 1)

Established Competencies

Students will be able to…

1. Develop a portfolio to organize and display evidence of their work.
3. Differentiate between the fields of civil engineering and architecture.

Acquisition

Students will know…

- The difference between civil engineering and architecture.
- How the art and science of architecture and civil engineering evolved over time.
- How historical innovations contributed to modern civil engineering and architecture.
- How visual design elements and principles manifest in architecture

Students will be skilled at…

- Identifying when and/or where a building was most likely built according to design elements, design principles, and architectural styles.

Evidence (Stage 2)	
Evaluative Criteria	**Assessment Evidence**
Rubrics Test and Quizes	*Formative/Summative Assessments* *Homework* *Classroom Assignments* *Projects*

Civil Engineering and Architecture – Competency #1: **Develop a portfolio to organize and display evidence of their work.**				
Skill Assessed	1-Novice	2-Developing	3-Effective	4 - Advanced
Portfolio, Overall Aesthetics, Quality of Work, Organization	Poor Evidence. Pages missing, out of order. No organization	Fair Evidence. Seldom prepares documentation in a manner appropriate for display or college/job evaluation.	Good Evidence. Usually prepares documentation in a manner appropriate for display or college/job evaluation.	Excellent Evidence. Always prepares documentation in a manner appropriate for display or college/job evaluation.

Civil Engineering and Architecture – Competency #2: Use 3D architectural software to create and document the design of a home.				
Skill Assessed	1-Novice	2-Developing	3-Effective	4 - Advanced
3D Architecture Modeling	Models are not complete, are not related to initial drawings.	Models are presented but are not accurate in sizes and are not proportional to the structure.	Models are well-presented but 2 or 3 key aspects are inaccurate or missing.	Models of drawings are accurate and show clearly accurate sizes and proportion of the structure.
Dimensions and Annotation	Poor Skills. Has not added dims or annotations, leaving only software determined defaults	Fair Skills. Omits many dims and/or annotations. Some mislabeling	Good Skills. Supplies most dims and annotations. Locates most of them correctly	Excellent Skills. Dimensions and annotates properly and clearly
Renderings	Renderings show the outside details of the building. No additional elements have been added to make the rendering appear lifelike.	Renderings show the outside details of the building distinctly. Few if any additional elements have been added	Renderings show the outside details of the building. Landscaping and exterior finishes have been added but do not help the appearance of the building.	Renderings show the outside details of the building exactly. Elements such as landscaping and exterior finishes have been added to make the rendering appear lifelike.

Civil Engineering and Architecture – Competency #6: Create sketches to document a preliminary design plans.				
Skill Assessed	1-Novice	2-Developing	3-Effective	4 - Advanced
Sketching: Bubble Diagrams	No evidence of logical layouts. Diagrams not completed.	Some evidence of logical layouts. One or partial diagrams completed.	Evidence of two to three logical layouts completed	Evidence of more than three logical layouts completed.
Sketching: Pencil Techniques	Poor Skill. Lines, light, feathered, curved, converge	Fair Skill Lines, light, curved, converge	Good Skill. Lines vary, but fairly accurate	Excellent Skill. Excellent line quality, straight, correct line weight
Sketching: Pictorial 3D	Poor 3D Sketches Style doesn't show necessary detail.	Fair 3D Sketches Style doesn't show necessary detail.	Good 3D Sketches Acceptable style, some confusion.	Excellent 3D Sketches Proper style, shows details well
Sketching: Annotation	Poor Dimensioning. Dims are misplaced or missing, notes and symbols are confusing	Fair Dimensioning. Dims are misplaced or missing, notes and symbols are confusing	Good Dimensioning. Dims are properly placed, notes and symbols are in correct form	Excellent Dimensioning. Dims are applied correctly, notes and symbols are in correct form and placed correctly.

Civil Engineering and Architecture – Competency #9: **Develop abilities to apply the design process to civil engineering and architecture problems.**				
Skill Assessed	1-Novice	2-Developing	3-Effective	4 - Advanced
Design Process	Poor Evidence of Design Process. No steps applied to Design Challenge Problems	Fair Evidence of Design Process. Some steps applied to Design Challenge Problems	Good Evidence of Design Process. Most steps applied to Design Challenge Problems	Excellent Evidence of Design Process. All steps applied to Design Challenge Problems

Civil Engineering And Architecture Budget Considerations (Initial)

Product/Equipment	Quantity	Price
Rubber Mallet, Black, 16 oz.	2	$2.98
2009 International Building Code	1	$90.96
Auto Level, Nikon #AX2S, 20X magnification with stadia lines	3	$747.00
Tripod, Aluminum Extension Legs, CST heavy duty, Length Open-65" with shoulder strap	3	$209.94
Level Rod, Fiberglass, 13' length graduated in1/100ths	3	$130.68
Triangular, White Plastic Civil Engineering Scale with 10, 20, 30, 40,	20	$64.00
Engraved, White Plastic Architectural Scale, 12" Triangle with 6	20	$64.00
Sieve, Soil Testing, #4, 8"Dia.	2	$72.90
Sieve, Soil Testing, #40, 8" Dia.	2	$72.90
Rod Level Sokkia #8071-90	3	$51.84
Brass pan, 8" for soil sieve	2	$31.74
Brass Cover, 8" for sieve pan	2	$19.32
Pan, Aluminum, 20 3/4" X 12 3/4" X 4" Deep	2	$96.00
	Total	$1794.26

Civil Engineering And Architecture Budget Considerations (Yearly)

Product/Equipment	Quantity	Price
Balsawood Sheet 1/8" x 3" x 36"	3	$74.85
Paper Covered Ridged Foam Board, 3/16" x 12" x 36"	20	$36.00
	Total	$110.85