

Newport-Mesa Unified School District
Office of Career Technical Education
High School Course of Study

Course Title	Civil Engineering & Architecture				Course Code	[Office use only]	
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Transcript Title:	CivilEng&Arch1AB	Grades Levels:	9-12	Board Adoption Date:			
Content Area:	Interdisciplinary CTE	GPA Scale:	4.0	Date Course Submitted:	7/28/2021		
Credential Required:	CTE Credential	Graduation Subject Areas:	Elective	CALPADS Code:	7700		
UC/CSU "A-G" Area Approvals:	Desire D	School Site/person that wrote and submitted the course:			Woods		
Recommend Skills:	Autodesk, Algebra 1, Algebra 2						
Next course(s):	None at this time.						
Textbook and/or software to be used:	PLTW Learning Management System (LMS) Autodesk Revit Architecture – Building Design Software MD Solids – Structural Analysis Tool Microsoft Excel – Budgeting and Project Management						

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Civil Engineering & Architecture (CEA)

DATE: June 22, 2021

INDUSTRY SECTOR: Engineering & Architecture

PATHWAY: Engineering and Architecture

CALPADS TITLE: Introduction to Engineering and Architecture
Multiple Pathways (Pathway 999)

CALPADS CODE: 7700.

HOURS:

Total	Classroom	Laboratory/CC/CVE
180	65	115

JOB TITLE	ONET CODES	JOB TITLE	ONET CODES
Civil Engineering Technologists/Technicians	17-3022.00	Civil Engineers	17-2051.00
Architectural and Civil Drafters	17-3011.00	Architects	17-1011.00
Civil Engineering Assistant	17-3022.00	Cost Estimators	13-1051.00

COURSE DESCRIPTION:

Civil Engineering and Architecture (CEA) is a high school level course in the PLTW Engineering Program. In CEA students are introduced to important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3D architectural design software. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students will progress from completing structured activities to solving open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.

Through both individual and collaborative team activities, projects, and problems, students will solve problems as they practice common design and development protocols such as project management and peer review. Students will develop skill in engineering calculations, technical representation and documentation of design solutions according to accepted technical standards, and use of current 3D architectural design and modeling software to represent and communicate solutions.

Computational and Analytical Skills

- Analyze and/or design a simply supported beam
- Select a floor system to support applied loads
- Perform a closed loop (control) survey
- Perform sieve analysis and classify a soil sample
- Calculate heat loss/gain
- Calculate head loss and pressure in a pipe
- Estimate the simple cost of a small building system or project
- Calculate storm water runoff from a site
- Size a spread footing
- Create a project schedule for a small design project

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Design Experience

- Design a small single family residential structure that reflects a set of basic building guidelines
- Create a site opportunities map and site plan for a small residential structure
- Create a simple residential electrical plan
- Document a residential design with construction drawings and a 3D computer model using 3D architectural software
- Collaborate effectively with peers to design a renovation to an existing commercial facility according to applicable building codes and regulations
- Collaborate effectively with peers to design a viable small commercial building that meets identified code and ordinance requirements
- Use Low Impact Development principles to design a site that support a commercial facility
- Document the design or renovation of a commercial facility with construction drawings and a 3D computer model, using 3D architectural software
- Design a sewer lateral
- Analyze a given building/site design and make recommendations to identify errors and/or omissions improve energy efficiency reduce the quantity and/or improve the quality of storm water runoff

Professional Skills

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

PREREQUISITES: N/A

High School Name:	Site Prerequisite:
Cloud Campus	Green Architecture and IED recommended

A – G APPROVAL: ☐ Yes ☐ No ☒ Desired

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ARTICULATION: None at this time.

High School Name:	College Name:	College Course Title:
N/A		

LEVEL: ☒ Exploratory ☐ Introductory ☐ Concentrator ☐ Capstone

CERTIFICATION: None at this time.

High School Name:	Embedded/Leads to:	Description:
N/A		

METHOD OF STUDENT EVALUATION:

- ✓ Pre and Post test
- ✓ Student Projects
- ✓ Written work
- ✓ Observation record of student performance
- ✓ Completion of assignments and worksheets

METHOD OF INSTRUCTION:

- ✓ Lecture
- ✓ Group and individual applied projects
- ✓ Demonstration
- ✓ Field Trips
- ✓ Guest Speaker

RECOMMENDED TEXTS OR SOFTWARE:

PLTW Learning Management System (LMS)
Autodesk Revit Architecture – Building Design Software
MD Solids – Structural Analysis Tool
Microsoft Excel – Budgeting and Project Management

MODEL CTE PATHWAY: N/A

This is a singleton among other engineering courses.

Grade:	Fall Semester:	Spring Semester:
7 th	Design and Modeling (part of an elective wheel)	
8 th	Medical Detectives	Green Architecture
9 th -10 th	Introduction to Engineering Design (IED) 1A	Introduction to Engineering Design (IED) 1B
11 th -12 th	Civil Engineering and Architecture 1A	Civil Engineering and Architecture 1B

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CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS

California Department of Education CTE Standards website: <http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp>

INDUSTRY SECTOR

KNOWLEDGE AND PERFORMANCE ANCHOR STANDARDS

1.0 Academics

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Engineering and Architecture academic alignment matrix for identification of standards.

2.0 Communications

Acquire and accurately use Engineering and Architecture sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats. (Direct alignment with LS 9-10, 11-12.6)

2.1 Recognize the elements of communication using a sender–receiver model.

2.2 Identify barriers to accurate and appropriate communication.

2.3 Interpret verbal and nonverbal communications and respond appropriately.

2.4 Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.

2.5 Communicate information and ideas effectively to multiple audiences using a variety of media and formats.

2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

3.0 Career Planning and Management

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. (Direct alignment with SLS 11-12.2)

3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.

3.2 Evaluate personal character traits, such as trust, respect, and responsibility, and understand the impact they can have on career success.

3.3 Explore how information and communication technologies are used in career planning and decision making.

3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.

3.5 Integrate changing employment trends, societal needs, and economic conditions into career planning. 3.6

Recognize the role and function of professional organizations, industry associations, and organized labor in a productive society.

3.7 Recognize the importance of small business in the California and global economies. 2 Engineering and Architecture | EA

3.8 Understand how digital media are used by potential employers and postsecondary agencies to evaluate candidates.

3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.

4.0 Technology

Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Engineering and Architecture sector workplace environment. (Direct alignment with WS 11-12.6)

4.1 Use electronic reference materials to gather information and produce products and services.

4.2 Employ Web-based communications responsibly and effectively to explore complex systems and issues.

4.3 Use information and communication technologies to synthesize, summarize, compare, and contrast information from multiple sources.

4.4 Discern the quality and value of information collected using digital technologies, and recognize bias and intent of the associated sources.

4.5 Research past, present, and projected technological advances as they impact a particular pathway.

4.6 Assess the value of various information and communication technologies to interact with constituent populations as part of a search of the current literature or in relation to the information task.

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5.0 Problem Solving and Critical Thinking

Conduct short, as well as more sustained, research projects to create alternative solutions to answer a question or solve a problem unique to the Engineering and Architecture sector using critical and creative thinking; logical reasoning, analysis, inquiry, and problem-solving techniques. (Direct alignment with WS 11-12.7)

5.1 Identify and ask significant questions that clarify various points of view to solve problems.

5.2 Solve predictable and unpredictable work-related problems using various types of reasoning (inductive, deductive) as appropriate.

5.3 Use systems thinking to analyze how various components interact with each other to produce outcomes in a complex work environment.

5.4 Interpret information and draw conclusions, based on the best analysis, to make informed decisions.

7.0 Responsibility and Flexibility

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Engineering and Architecture sector workplace environment and community settings. (Direct alignment with SLS 9-10, 11-12.1)

7.1 Recognize how financial management impacts the economy, workforce, and community.

7.2 Explain the importance of accountability and responsibility in fulfilling personal, community, and workplace roles.

7.3 Understand the need to adapt to changing and varied roles and responsibilities.

7.4 Practice time management and efficiency to fulfill responsibilities.

7.5 Apply high-quality techniques to product or presentation design and development.

7.6 Demonstrate knowledge and practice of responsible financial management.

7.7 Demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession.

7.8 Explore issues of global significance and document the impact on the Engineering and Architecture sector.

8.0 Ethics and Legal Responsibilities

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms. (Direct alignment with SLS 11-12.1d)

8.1 Access, analyze, and implement quality assurance standards of practice.

8.2 Identify local, district, state, and federal regulatory agencies, entities, laws, and regulations related to the Engineering and Architecture industry sector.

8.3 Demonstrate ethical and legal practices consistent with Engineering and Architecture sector workplace standards. 4
Engineering and Architecture | EA

8.4 Explain the importance of personal integrity, confidentiality, and ethical behavior in the workplace.

8.5 Analyze organizational culture and practices within the workplace environment.

8.6 Adhere to copyright and intellectual property laws and regulations, and use and appropriately cite proprietary information.

8.7 Conform to rules and regulations regarding sharing of confidential information, as determined by Engineering and Architecture sector laws and practices.

9.0 Leadership and Teamwork

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution. (Direct alignment with SLS 11-12.1b)

9.1 Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.

9.2 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills, as applied in groups, teams, and career technical student organization activities.

9.3 Understand the characteristics and benefits of teamwork, leadership, and citizenship in the school, community, and workplace setting.

9.4 Explain how professional associations and organizations and associated leadership development and competitive career development activities enhance academic preparation, promote career choices, and contribute to employment opportunities.

9.5 Understand that the modern world is an international community and requires an expanded global view. 9.6

Respect individual and cultural differences and recognize the importance of diversity in the workplace. 9.7 Participate in interactive teamwork to solve real Engineering and Architecture sector issues and problems.

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10.0 Technical Knowledge and Skills

Apply essential technical knowledge and skills common to all pathways in the Engineering and Architecture sector, following procedures when carrying out experiments or performing technical tasks. (Direct alignment with WS 11-12.6)

10.1 Interpret and explain terminology and practices specific to the Engineering and Architecture sector.

10.2 Comply with the rules, regulations, and expectations of all aspects of the Engineering and Architecture sector.

10.3 Construct projects and products specific to the Engineering and Architecture sector requirements and expectations.

10.4 Collaborate with industry experts for specific technical knowledge and skills.

11.0 Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the Engineering and Architecture anchor standards, pathway standards, and performance indicators in classroom, laboratory and workplace settings, and through the SkillsUSA career technical student organization or alternative opportunity.

11.1 Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge and skills gained during classroom instruction and laboratory practices specific to the Engineering and Architecture sector program of study.

11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

11.3 Demonstrate entrepreneurship skills and knowledge of self-employment options and innovative ventures.

11.4 Employ entrepreneurial practices and behaviors appropriate to Engineering and Architecture sector opportunities.

11.5 Create a portfolio, or similar collection of work, that offers evidence through assessment and evaluation of skills and knowledge competency as contained in the anchor standards, pathway standards, and performance indicators.

CR/TH = Classroom/Theory Hours LAB/CC = Laboratory/Shop/Community Classroom Hours

I.	Overview of Civil Engineering and Architecture	CR/TH	LAB/CC	STANDARDS
	<p>Unit 1 provides an introduction and overview to the past accomplishments within the fields of civil engineering and architecture as well as a brief introduction to the wide variety of careers within the fields of civil engineering and architecture.</p> <p>Overview of Civil Engineering and Architecture</p> <ul style="list-style-type: none"> Lesson 1.1 History of Civil Engineering and Architecture Lesson 1.2 Careers in Civil Engineering and Architecture <p>Lesson 1.1 History of Civil Engineering and Architecture The goal of this lesson is to introduce students to the vast history of accomplishments in civil engineering and architecture. The study and improvements on these accomplishments have paved the way for the structures that we use today. In this lesson students will begin to build a common vocabulary related to architectural styles and features, structural systems, and the elements and principles of design.</p>	10	14	<p>Academic: LS: 11-12.1, 11-12.2 RSIT: 11-12.2, 11-12.7 RHSS: 11-12.2, 11-12.7, 11-12.10, RLST: 11-12.7, 11-12.10 WS11-12.2, 11-12.4, 11-12.6, 11-12.7, 11-12.8 WHSST: 11-12.2, 11-12.6, 11-12.7 US: 11.2, 11.5, 11.8 CSR: 1, 2 HR: 4, HI: 1,3 ESS3.A, 3C, 3D ETS2.B</p> <p>CTE Anchor: 1, 2, 3, 4, 8, 9, 10, 11, 12</p> <p>CTE Pathway: A1, A2, A4, A5, A6, A7, A8, A9</p>

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	<ul style="list-style-type: none"> • Lesson 1.1.1 History of Civil engineering and Architecture • Lesson 1.1.2 Design Principles and Elements • Project 1.1.3 Architectural Styles • Project 1.1.4 Architectural Features <p>Lesson 1.2 Careers in Civil Engineering and Architecture This lesson will provide foundation and perspective for students regarding careers in civil engineering and architecture as they venture through the remainder of the course. The primary duties and responsibilities of civil engineers (and related specialty disciplines) and architects are presented as well as the traditional educational and accreditation requirements that must be met in order to become a professional engineer and architect. Career connections and relationships between these two types of professionals and other stakeholders involved in building design and development are also introduced.</p> <ul style="list-style-type: none"> • Lesson 1.2.1 This Is Your Career • Project 1.2.2 Design Charrette 			
II.	Residential Design	CR	LAB/CC	STANDARDS
	<p>This unit of study introduces students to standard practice in the design of single family homes and provides an opportunity for students to develop a small single family home design that incorporates sustainable design practices as well as universal design features. Students will be introduced to building codes and their impact on design as well as common wood-framed residential construction techniques and practices. Students also will investigate the cost of construction and the significant impact of the choice of construction materials and practices on the ongoing cost of energy for heating and cooling. They will apply this knowledge to the design of a small, affordable home.</p>	20	35	<p>Academic: LS: 11-12.1, 11-12.2 RSIT: 11-12.2, 11-12.7 RHSS: 11-12.2, 11-12.7, 11-12.10, RLST: 11-12.4, 11-12.7, 11-12.10 WS11-12.2, 11-12.4, 11-12.6, 11-12.7, WHSST: 11-12.2, 11-12.5, 11-12.6, 11-12.7 US: 11.2, 11.5, 11.8 CSR: 1, 2 Algebra A-CED 1.1, 2, 3, 4 Algebra A-REI 3.1 Functions F-IF 8 F-TF 3.1, 3.2 Geometry – G-GMD 5, G-MG 3 Number and Quantity N-Q 1, 2, 3 Scientific and Engineering Practices – SEP 1, 2, 3, 4, 5, 6, 8 Crosscutting Concept</p>

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<p>Residential Design Lesson Summary</p> <ul style="list-style-type: none"> • Lesson 2.1 Building Design and Construction • Lesson 2.2 Cost and Efficiency Analysis • Lesson 2.3 Residential Design <p>Lesson 2.1 Building Design and Construction In this lesson students will learn typical wood-framed residential construction techniques and practices. They will build a common vocabulary related to building components and materials and become familiar with a variety of residential framing methods and roof styles. In addition, students will be introduced to technical documentation of residential structures and will use 3D architectural modeling software to model and document the design of a small outdoor storage structure.</p> <p>Lesson 2.1.1 Wood Frame Systems Lesson 2.1.2 Roof Systems Lesson 2.1.3 Utility Shed Design</p> <p>Lesson 2.2 Cost and Efficiency Analysis In this lesson students investigate the cost of construction and the recurring energy costs associated with design decisions and construction techniques. Students will have the opportunity to perform quantity take-offs and cost estimates related to parts of small construction projects. In addition students will learn about and compare the energy efficiency of a variety of construction materials and calculate the rate of heat loss or gain through a building envelope which can be used to estimate energy demands for heating and cooling a building.</p> <p>Lesson 2.3 Residential Design In this lesson students apply elements of good residential building and site design to design a small affordable home for a client based on information gathered during a client interview and meetings. Students will perform code research and develop a design that meets applicable building codes and requirements as well as universal</p>		<p>CC 1, 3, 4, 6, 7 ESS3A, 3C, 3D ETS 1.A, 1B, 1C ETS 2.A, 2B</p> <p>CTE Anchor: 1, 2, 4, 5, 7, 8, 9, 10, 11, 12</p> <p>CTE Pathway: A1, A2, A3, A4, A5, A6, A7, A8, A9</p>
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	design principles. Students will also learn about sustainable building practices which they will apply to their home design in an effort to reduce the environmental impact of the building. Basic site design and orientation considerations are presented to guide students in appropriately locating the home on the building site to improve usability and reduce environmental impact. During the design process, students will also be introduced to a variety of residential foundation systems, basic residential electrical system components, plumbing systems and water supply calculations, and wastewater disposal and treatment systems. They will include consideration of these systems in their design development.			
III.	Commercial Applications	CR	LAB/CC	STANDARDS
	<p>This unit will provide students with an opportunity to discover the diversity and complexity of commercial building design as they design a renovation to a commercial facility. The design of commercial facilities includes multiple building systems and involves a wide range of engineering and architectural considerations. In this unit students will learn about site considerations important to the function of the building. Students will learn about common built-up systems that provide the building envelope such as walls and roofs. They will learn about the utilities and services that supply power, water, and communication services to the building. In addition students will learn about common structural systems employed to support all of the building components. Applying the knowledge they gain from this unit of study, students will design a renovation to a commercial facility and document that design using 3D architectural software.</p> <p>Commercial Applications Lesson Summary</p> <ul style="list-style-type: none"> • Lesson 3.1 Commercial Building Systems • Lesson 3.2 Structures • Lesson 3.3 Services and Utilities 	25	36	<p>Academic: LS: 11-12.1, 11-12.2 RSIT: 11-12.2, 11-12.7 RHSS: 11-12.2, 11-12.7, 11-12.10, RLST: 11-12.4, 11-12.7, 11-12.10, 11-12 WS11-12.2, 11-12.4, 11-12.6, 11-12.7, 11-12.8 WHSST: 11-12.6, 11-12.7 US: 11.2, 11.5, 11.8 A-CED 1.1 A-CED 2, 3, 4 A-REI 1, 2, 3, 4, 5, 6, 7 F- IF 8a, b F-TF1.1, 2.3.1, 3.2 G-CO 12 G-MG 3 G-SRT 1 N-Q 1, 2, 3 N-VM 1, 2, 3, 4, 5 SEP1, 2, 4, 5, 6, 7, 8 CC: 1, 2, 3, 4, 5, 6, 7 PS1A, 2.A, 2.B, 2.C, PS3.A, 3.B, 3.D: ETS1.A, 1.B, 1.C ETS2.A, 2.B HI: 1,3 ESS3.A, 3C, 3D ETS2.B</p> <p>CTE Anchor: 1, 2, 4, 5, 8, 9, 10, 11, 12</p> <p>CTE Pathway: A1, A2, A4, A5, A6, A7, A8, A9</p>

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<ul style="list-style-type: none"> • Lesson 3.4 Site Considerations <p>Lesson 3.1 Commercial Building Systems In this lesson students will be exposed to the design and development of commercial facilities and the building codes and land development regulations that impact commercial construction. Students are presented with a commercial renovation design project on which they will work throughout this unit. They will research building codes and land development regulations and learn about a variety of commercial wall, roof, and floor framing systems as they further develop a common vocabulary related to building design and development. Students continue to build expertise in the use of a 3D architectural design software package as they model and document their commercial design project ideas.</p> <ul style="list-style-type: none"> • Lesson 3.1.1 Keystone Library Renovation • Lesson 3.1.1 Land Use and Development Regulations • Lesson 3.1.3 Commercial Wall Systems • Lesson 3.1.4 Commercial Roof Systems • Project 3.1.5 Structural Efficiency Systems • Project 3.1.6 Commercial Floor Systems <p>Lesson 3.2 Structures This lesson is designed to introduce students to the concepts and principles of structural engineering and structural efficiency. The activities related to this lesson are designed to aid students in learning about the variety of forces that impact the design and performance of a building and how to quantify those loads using building codes and the physical characteristics of the structure. Students are also introduced to the physical laws and mathematics involved in determining the internal resistive forces generated by the imposed loads as the loads are transferred through the structural elements of the building into the</p>			
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<p>ground. A variety of structural systems and common commercial foundation systems are presented, and the lesson focuses on the analysis and design of beams and spread footings.</p> <ul style="list-style-type: none"> • Project 3.2.1 Structural Forms(optional) • Activity 3.2.2 Loads • Activity 3.2.3 Beam Analysis • Activity 3.2.4 Beam Analysis Shortcuts • Project 3.2.5 Build a Beam • Activity 3.2.6 Beam Design • Activity 3.2.7 Keystone Library Floor Framing Design (optional) • Activity 3.2.8 Foundations Types and Considerations • Activity 3.1.10 Keystone Library Spread Footing Analysis <p>Lesson 3.3 Services and Utilities This lesson will introduce students to the multiple modern utilities and services required in order for a building to function effectively and lawfully in today's society. These utilities and services include a reliable supply of energy and water, a system to dispose of wastes, and capacity for communication via multiple modes. Students will identify typical utilities and services for commercial buildings and common methods for distribution and measuring of those services. They will interpret and apply building code requirements and consider other physical constraints in the design and location of new utility service connections for their commercial project. In addition, students will interpret and apply energy code requirements in the design of their commercial project building envelope and internal utility distribution systems in an effort to conserve natural resources, reduce operating costs, and protect the environment from the negative impact of development.</p> <ul style="list-style-type: none"> • Activity 3.3.1 Utilities • Activity 3.3.2 Plumbing (optional) • Activity 3.3.3 Wastewater Management (Optional) 			
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	<ul style="list-style-type: none"> Activity 3.3.5 Commercial Electrical Systems (optional) Activity 3.3.6 HVAC Systems <p>Lesson 3.4 Site Considerations In this lesson students will learn about the important factors to be considered in commercial site design. They will perform a land survey, conduct a soil analysis, and conduct a physical investigation of the site in order to gather information relevant to their commercial project design. Students will use the information they have collected to design and document appropriate site improvements to provide adequate parking based on facility use and building code requirements and provide safe vehicular and pedestrian traffic access and flow. The site must also provide handicap access and provide access for emergency vehicles and the movement of goods and waste. Students will also become familiar with the requirements related to storm water runoff and management and learn the calculations necessary to comply with building codes. Based on the information they acquire during this lesson, students will design and document a site design for their commercial project. Their design will utilize low impact development techniques in order to incur minimal impact on people and the environment.</p> <ul style="list-style-type: none"> Activity 3.4.1A Differential Leveling Project 3.4.1B Control Survey Activity 3.4.2 Parking Lot Design Activity 3.4.4 Web Soil Survey Activity 3.4.5 Storm Water Management 			
IV.	Commercial Building Systems	CR	LAB/CC	STANDARDS
	This unit will allow students to collaborate on the design and documentation of a small commercial facility within a project design team. They will identify a need within their community, investigate a potential site, develop a preliminary design, and document the design of the facility as a team. They will also present their	5	20	Academic: LS: 11-12.1, 11-12.2 RSIT: 11-12.2, 11-12.7 RHSS: 11-12.2, 11-12.7, 11-12.10, RLST: 11-12.4, 11-12.7, 11-12.10, 11-12 WS11-12.2, 11-12.4, 11-12.6, 11-12.7, 11-12.8 WHSST: 11-12.6, 11-12.7 US: 11.2, 11.5, 11.8 A-CED 1.1

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<p>design concept to a panel that will critique their design and offer feedback to the team related to their design and presentation.</p> <p>Commercial Building Design Lesson Summary</p> <ul style="list-style-type: none"> • Lesson 4.1 Commercial Building Design Problem • Lesson 4.2 Commercial Building Design Presentation <p>Lesson 4.1 Commercial Design Problem</p> <p>In this lesson students will work within design teams to develop a preliminary design for a small commercial facility. As part of the design process, they will investigate a potential site for development of their commercial project; research codes, zoning ordinance, and regulations that impact the site; and determine the legal description of the property. Students will develop an architectural program to describe the desired outcome of the project and help guide development. They will become familiar with legal, physical, and financial conditions that should be considered in order to determine the viability of project development and help determine whether a project solution should be undertaken. As the team project progresses, students will apply the skills and knowledge they have gained throughout the course to the team commercial project. They will learn new skills related to team design work, including creating a project organization chart, developing and using a Gantt chart to plan and monitor project progress, and holding regular team meetings. Students will document their design according to accepted practice using 3D architectural modeling software.</p> <ul style="list-style-type: none"> • Problem 4.1.1 Commercial Building Design Problem • Activity 4.1.2 Team Building • Activity 4.1.3 Property Description • Activity 4.1.4 Site Discovery • Activity 4.1.6 Commercial Project Viability • Activity 4.1.7 Commercial Management 		<p>A-CED 2, 3, 4 A-REI 1, 2, 3, 4, 5, 6, 7 F- IF 8a, b F-TF1.1, 2.3.1, 3.2 G-CO 12 G-MG 3 G-SRT 1 N-Q 1, 2, 3 N-VM 1, 2, 3, 4,5 SEP1, 2, 4, 5, 6, 7, 8 CC: 1, 2, 3, 4, 5, 6, 7 PS1A, 2.A, 2.B, 2.C, PS3.A, 3.B, 3.D: ETS1.A, 1.B, 1.C ETS2.A, 2.B ESS3.A, 3C, 3D</p> <p>CTE Anchor: 1, 2, 4, 8, 9, 10, 11, 12</p> <p>CTE Pathway: A1, A2, A4, A5, A6, A7, A8, A9</p>
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	Lesson 4.2 Commercial Design Presentation In this lesson students will create and deliver a formal presentation (both oral and written) of their final team commercial design project to include a description of both the design process (and justifications of design decisions) as well as the resulting design. The project presentation will be reviewed and critiqued by a panel who will offer feedback to the team related to their design process, decision making, and the resulting design and documentation. <ul style="list-style-type: none"> • Activity 4.2.1 Creating a Model (optional) • Activity 4.2.2A Commercial Building Design/Presentation • Activity 4.2.2B Commercial Building Design Trade Show 			
V.	Employment Portfolio	CR	LAB/CC	STANDARDS
	Students will prepare a professional portfolio. <ul style="list-style-type: none"> • Portfolio showcases best professional level work • Portfolio is organized • Job application • Resume • References 	5	10	Academic: LS 9-10, 11-12.6 SLS 11-12.2 CTE Anchor: 1, 2, 4, 8, 9, 10, 11, 12 CTE Pathway: A1, A2, A4, A5, A6, A7, A8, A9