

Colorado CTE Course – Scope and Sequence

Course Name	Advanced Drafting Technology III		Course Details	Credit = 1.0	
			Course = 0.50 Carnegie Unit Credit	Prerequisite: Drafting Technology II CTE Credential: CTE STEM, CTE Architecture & Construction	
Course Description	This class focuses on advanced mechanical drafting, architectural, residential, and commercial structures, as well as industrial product design concepts. Students will apply model making skills to produce scale models. A majority of this class will focus on programs such as SolidWorks, ArchiCad, and Google SketchUp. This class will provide a platform for all advanced students that are serious about the potential of a career in the world of design and architecture. Students will use their drafting skills to create real-world products and prototypes. They will calculate cost and evaluate key design features for structural stability and product appeal.				
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.				
SCED Identification #	21102	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.			
All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills					
Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Career Development		<p>Strategize informed career decisions that reflect career goals.</p> <p>Develop employability and technical skills requirements in drafting and design and related fields.</p> <p>Identify employer expectations and requirements for workplace safety and employment.</p>	<p>The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:</p> <p>(A) identify employment opportunities, including entrepreneurship and preparation requirements, in the field of drafting and design;</p>	<p>Research the various types of personal portfolios. Explain the purpose of creating personal portfolios (e.g., educational and occupational). Develop and maintain a design portfolio that includes physical and digital works. Describe how portfolios are dynamic and require maintenance.</p> <p>Describe the role of a crew leader. List the characteristics of effective leaders. Be able to</p>	

		<p>Understand the workplace environment for drafting and designing careers.</p> <p>Investigate effective workplace communication strategies for individuals and teams.</p>	<p>(B) demonstrate an understanding of group participation and leadership related to citizenship and career preparation;</p> <p>(C) identify employers' expectations and appropriate work habits;</p> <p>(D) apply the competencies related to resources, information, systems, and technology in appropriate settings and situations; and</p> <p>(E) demonstrate knowledge of the concepts and skills related to health and safety in the workplace, as specified by appropriate governmental regulations.</p>	<p>discuss the importance of ethics in a supervisor's role. Identify the three styles of leadership and relate them to when they might be used on the jobsite.</p> <p>Research local opportunities and requirements for architectural drafting or building modeling positions. Analyze your personal characteristics and technical skills and investigate ways to develop skills that are desired by local businesses. Create a personal development plan.</p>	
<p>Architectural Principles and Code</p>		<p>Understand and apply architectural principles and codes for drafting and designing residential structures.</p> <p>Identify architectural products and styles.</p>	<p>The student knows the concepts and skills that form the technical knowledge of architectural computer-aided drafting. The student is expected to:</p>	<p>Identify various building codes and regulations (e.g., ICC, IBC, IRC, ADA, and NEC).</p> <p>Research types of codes and regulations required for building construction. Explain the purpose of building codes and regulations. Describe how</p>	

		<p>Identify building codes and governing bodies.</p>	<p>(A) demonstrate knowledge of architectural design principles;</p> <p>(B) determine building code and zoning requirements for building types in a selected area;</p> <p>(C) demonstrate knowledge of the various grades and types of construction materials.</p> <p>(D) complete work orders and related paperwork;</p> <p>(E) estimate jobs, schedules, and standard industry practices related to legal restrictions;</p> <p>(F) read and interpret architectural symbols, schematics, blueprints, work drawings, manuals, and bulletins;</p> <p>(G) apply descriptive geometry related to auxiliary views, revolutions, and intersections; and</p> <p>(H) Identify agencies and their roles in regulating</p>	<p>building codes and regulations affect the design process.</p> <p>Apply the Uniform Building Code (UBC) to a residential design. Discuss the design requirements to meet the minimum FHA residential Standards.</p> <p>Evaluate the different siding types that will affect the design of a residence and orally or in writing explain the impact of selection.</p> <p>Draw an electrical plan utilizing an existing plan.</p> <p>Demonstrate how to use mathematical formulas to support proper application of building codes (e.g., tables and schedules). Prepare and draft schedules (e.g., window, door, and room).</p> <p>Examine national, state, and local energy and efficiency policies.</p> <p>Describe how social, environmental, and financial constraints influence the design process. Describe the impact of construction on the environment. Identify the design practices that can</p>	
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			sustainable practices and building efficiency (e.g., USGBC and LEED).	lessen adverse impacts on the environment. Research sustainable design practices. Summarize techniques for energy efficient construction. Diagram the lifecycle of a building.	
Advanced CADD Functions		Demonstrate advanced CADD skills and techniques for construction and mechanical applications.	<p>The student knows the function and application of the tools, equipment, technologies, and materials used in architectural and mechanical computer-aided design. The student is expected to:</p> <p>(A) use the tools, materials, and equipment commonly employed in the field of computer-aided design in a safe manner;</p> <p>(B) demonstrate advanced CADD skills and techniques;</p> <p>(C) develop and display three-dimensional models and</p> <p>(C) demonstrate knowledge of new and emerging technologies</p>	<p>UTILIZE TEMPLATES, SYMBOLS, AND LIBRARIES:</p> <ul style="list-style-type: none"> • Describe the use of symbols • Create and save symbols • Utilize symbols • Edit symbols • Assign symbol properties (i.e., attributes, parameters, constraints) • Edit symbol properties • Create and utilize symbol libraries • Create template files <p>DEVELOP AND DISPLAY THREE-DIMENSIONAL MODELS:</p> <ul style="list-style-type: none"> • Interpret and define the right-hand rule for the x, y, and z-axes • Develop three-dimensional models (i.e., wireframe, surface, solid, or parametric) • Manipulate the x-y plane in three-dimensional space 	

			that may affect the field of drafting and design.	<ul style="list-style-type: none"> • Display three-dimensional objects from various viewpoints • Edit the shape and configuration of solid models • Display objects as shaded or hidden lines removed • Create working drawings from three-dimensional models 	
Interior Drawings (optional)		Use a computer-aided drafting system to create and modify nonresidential or residential interior drawings.	<p>Use a computer-aided drafting system to create and modify nonresidential or residential architectural drawings. Student is expected to:</p> <p>(K) demonstrate through drawings the development of maximum efficiency of circulation within areas or rooms;</p> <p>(L) develop a site plan using maximum orientation of the building relative to views, sun, and wind direction;</p> <p>(M) draw building designs and styles to ensure compatibility between interior and</p>		

			<p>exterior to enhance overall appearance;</p> <p>(N) draw schematic site plans, floor plans, roof plans, building elevations, sections, perspectives, and character sketches using design development techniques;</p> <p>(O) draw scaled wall thickness plans, interior elevations, and sections;</p> <p>(P) develop details, sections, floor and wall sections, ceiling and roof sections, door and window sections, and other sections as required;</p> <p>(Q) assemble an architectural design in three dimensions;</p> <p>(B) construct architectural drawings using advanced computer-aided design drafting skills;</p> <p>(C) create two- or three-point perspectives;</p>		
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			<p>(D) create three-dimensional solid models;</p> <p>(E) view three-dimensional objects in several different positions;</p> <p>(H) plot architectural drawings for presentation; and</p> <p>(I) render three-dimensional objects with applied materials.</p>		
<p>Housing Design (optional)</p>		<p>Consider architectural factors and consumer decisions that affect housing construction and finishes when drafting and designing plans.</p>	<p>The student makes advanced, informed judgments about personal architectural projects and the architectural projects of others. The student is expected to:</p> <p>(A) identify architectural styles and architectural features exemplified in housing;</p> <p>(B) summarize considerations for housing site selection;</p> <p>(C) evaluate basic housing construction and finishing considerations;</p>		

			<p>(D) research and describe the effects of technology on current and future housing trends;</p> <p>(E) interpret, evaluate, and justify architectural artistic decisions in personal architectural artworks; and</p> <p>(F) select and analyze original architectural artworks, portfolios, and exhibitions by peers and others to form precise conclusions about formal qualities, historical and cultural contexts, intents, and meanings.</p>		
Project Design Lab		<p>Apply the processes, concepts, and principles of drafting and design to explore and develop advanced skills in their program area.</p> <p>Use software, technology, and industry-standard drafting and design equipment.</p>	<p>Expand the students' opportunities for applied learning. This course provides an in-depth lab experience that applies the processes, concepts, and principles as described in the classroom instruction. The coursework will encourage students to explore and develop advanced skills in their program area. The appropriate use of</p>	<p>SAMPLE TOPICS:</p> <ul style="list-style-type: none"> •Compete in a design challenge (local, state, or national competitions) •Design and complete a set of industry standard construction documents or engineering documents •Research colleges and scholarship opportunities and prepare all necessary paperwork •Create a drafting and design 	

