CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Architecture & Construction

Learning that works for Colorado CTE®

Colorado CTE Course – Scope and Sequence

Course Name	Construction Management I	Course Details	Credit= 1.0
		Course = 0.50 Carnegie Unit Credit	Prerequisite: Completion of level 2 Construction Pathways Course CTE Credential: Architecture and Construction
Course Description	This course provides an introduction to construction management principles used in the industry, including the organization of project teams, role of the project manager, how project management is used within the industry, and basic project management concepts and techniques.		
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 #	17016	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		Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.	Student explores career opportunities and skills required in construction management professions. Student is expected to: (A) identify employment opportunities, including entrepreneurship and career preparation requirements, in the field of construction management;	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. Participate in interactive teamwork to solve real Building and Construction Trades sector issues and problems.	Updates to ICAP

			(B) Define leadership and identify the responsibilities, competencies, and behaviors of successful Leaders; (C) demonstrate an understanding of group participation and leadership related to career preparation; (D) identify employers' expectations, including appropriate work habits; and (E) apply the competencies related to resource technology in appropriate settings.	Demonstrate ethical and legal practices consistent with Building and Construction Trades sector workplace standards. Research the management skills needed in today's business environment (such as goal setting, decision making, communications, delegation, technical skills, motivational and leadership skills). Through the analysis of case studies, discuss the role of business leaders who have been recognized for their influence on modern managerial approaches (such as Theory Z's William Ouchi, General Electric's Jack Welch, Hewlett-Packard's Carleton Fiorina, or Facebook's Sheryl Sandberg). Synthesize research to produce a profile of a strong candidate for a business manager, citing specific evidence from text.	
Construction Employability Skills		Employ practices and behaviors appropriate to Building and Construction	The student applies professional standards/employability skills	Utilize work-based/workplace learning experiences to demonstrate and expand upon knowledge	

		Trades sector opportunities. Apply professional skills for managing construction projects. Interpret and apply information from technical drawings, schedules, and specifications used in the construction trades.	of construction management. The student is expected to: (A) demonstrate effective verbal and written communication skills with individuals from varied cultures, including fellow workers, managers, and customers; (B) complete work orders and related paperwork; (C) estimate jobs, schedules, and industry standards related to legal restrictions; (D) read and interpret appropriate architectural symbols, schematics, blueprints, work drawings, manuals, and bulletins; and (E) apply descriptive geometry related to auxiliary views, revolutions, intersections, and piping drawings; and (F) demonstrate knowledge of the concepts and skills related to health and safety in the workplace, as specified by appropriate governmental regulations.	and skills gained during classroom instruction and laboratory practices specific to the Building and Construction Trades sector program of study. Coordinate a real or simulated work environment to practice project management skills. Students may be evaluated on technical and project management skills developed by a variety of means.	

Building Materials and Processes		Apply knowledge of construction materials and processes to construction management.	The student gains knowledge about building materials used in the construction industry. The student is expected to: (A) identify various types of construction materials and methods; (B) identify the grades and markings of wood and other building materials; (C) describe the proper method of storing and handling building materials; (D) calculate quantities of lumber and wood products using industry-standard methods; and (E) describe the chemical, mechanical, and physical properties of construction materials; and (F) describe the processes used in construction.	See sample outcomes/measurements from the Building Materials Course.	
Construction Systems		Understand how construction systems and work performed are	The student describes how a systems model can be used to describe construction	Explain how work is coordinated on a large construction project. What	

		coordinated in a construction project.	activities, including mechanical, fluid, electrical, and thermal systems. The student is expected to: (A) apply the universal systems model to construction activities; (B) identify the inputs, processes, outputs, and feedback associated with construction systems; and (C) describe how technological systems interact to achieve common goals. The student selects and uses the proper construction technology to meet practical objectives. The student is expected to: (A) distinguish between architectural and civil construction systems; (B) apply construction technology to individual or community problems; (C) describe the factors that affect the purchase and use of constructed items; and	are the key systems involved in the project and how are they managed. Identify important deliverables that are found in construction projects and identify who is responsible for their delivery. Investigate how various construction companies use technology to manage coordinated projects. Investigate how the management of architectural project differ from civil projects. Identify additional considerations for each type from a project management perspective.	

			(D) identify and describe the roles of construction.		
New Construction Technology		Understand the role of technology for management of construction projects.	The student investigates emerging and innovative construction technologies. The student is expected to: (A) report on emerging and innovative construction technologies; and (B) conduct research and experimentation in construction technology. The student describes the intended and unintended effects of technological solutions. The student is expected to: (A) apply an assessment strategy to determine the risks and benefits of technological developments in construction; (B) describe how technology has affected individuals, societies, cultures, economies, and environments;	Research project management technology used in the construction industry. Identify new and emerging technology and practices. Examine the popularity of the technology and evaluate against cost and other factors. Consider the regional impact of a large construction projects. Investigate the economic impact and the personnel needs required for the project. Discuss how construction effects local economies. How do technologies play a role.	

			(C) discuss the international effects of construction technology; and (D) describe the issues related to regional and community planning.		
Quality Control		Understand how quality control is used in the project quality management process.	The student describes quality and how it is measured in construction. The student is expected to: (A) differentiate between quality control and quality assurance; (B) describe different quality control applications in construction; and (C) apply continuous quality improvement techniques to the construction of a building or structure.	Describe how to implement a quality process. Describe how to monitor rework and its related cost. Describe the development of a quality checklist.	
PMP Basics		Develop essential project management skills.	The student understand best practices in construction project management. The student is expected to:	Describe the management process and examine the functions of management (planning, organizing,	

			(A) identify the function of a project manager; (B) define the project management process; and (C) understand the elements of the PMP management processes, including initiating, planning, executing, monitoring and controlling, and closing a project.	leading, and controlling). Through review of case studies or news media, illustrate how concerns for the environment, an increasingly diverse workforce, globalization of the marketplace, and rapidly changing technology have impacted how businesses apply these functions. Analyze the elements of sample business plans or business plan templates found in informational text, identifying and describing the purpose of common elements. Discriminate between elements that govern culture (such as vision, mission, core priorities and social responsibility) and those that may govern operational goals (such as market share, profitability, and product development).	
Business Regulatory Environment		Apply the appropriate codes, laws, standards, or	The student applies the appropriate codes, laws,	Identify and list appropriate national, state, and local	

		regulations related to construction projects.	standards, or regulations related to construction technology. The student is expected to: (A) explain the importance of codes, laws, standards, or regulations related to construction technology; (B) identify areas where codes, laws, standards, or regulations related to construction technology may be required; and (C) comply with appropriate codes, laws, standards, or regulations.	bodies governing the operations of the selected business. Review documentation to summarize federal, state, and local regulations and laws (such as environmental regulations, zoning or licensing requirements, and legal stipulations) that are necessary for the continued operations of the selected business.	
Budgeting		Understand basic budgeting techniques used in project management.	The student identifies the factors that influence the cost of goods and services in construction projects. The student is expected to: (A) develop a budget for a construction project; and (B) determine the most effective strategies to minimize costs.	Identify the steps of the cost estimating process. Explain the relationships between estimated and actual cost. Describe the elements of cost control and cost reporting.	
Specifications and Estimating		Understand how the specifications for	The student learns how to interpret architectural and		

		construction projects are conveyed in construction drawings and designs.	engineering working drawings and specifications. The student will become familiar with the symbols and nomenclature specific to the construction industry. The student is expected to: (A) describe the types of drawings usually included in a set of plans; (B) identify the different types of lines used on construction drawings; (C) identify selected architectural symbols commonly used to represent materials on plans; (D) identify selected electrical, mechanical, and plumbing symbols commonly used on plans; (E) identify selected abbreviations commonly used on plans; (F) read and interpret plans, elevations, schedules, sections, and details contained in basic construction drawings;		

			(G) state the purpose of written specifications; and (H) demonstrate or describe how to perform a quantity takeoff for materials.		
Safety Considerations		Use and apply jobsite-specific safety information.	Understand how a company's safety performance affects the profit and loss and its ability to remain competitive in the future. Student is expected to: (A) Describe the duties and responsibilities of a project manager with respect to safety and loss prevention. (B) Identify the direct and indirect costs of incidents. (C) Identify potential areas for loss.	Describe OSHA's inspection and penalty requirements. Explain how to plan and implement a safety program. Identify the elements of a safety program. Describe employee involvement in safety programs. Describe emergency reporting and response requirements.	
Communication and Stakeholder Management		Understand the importance of communication and human relations skills in project managers.	Understand the importance of communication and human relations skills in project managers for managing stakeholder engagement and project teams. Student is expected to: A) Identify project stakeholders and the	Create a list of your personal stakeholders. Explain how would you manage communication for major life event. Identify common communication practices and standards in the construction industry. Discuss the role of	

			project manager's responsibilities related to stakeholders; B) Demonstrate effective communications skills; C) Explain the importance of understanding human relations requirements; and D) Identify the legal policies that affect an organization.	formal and informal communication and when it is used in project management. Identify the legal policies that affect all business organizations. Research any additional legal requirements construction companies have. Explain the importance of ethical conduct in a project manager.	
Construction Documents		Investigate common construction documents and their use in planning and managing projects.	Student understands the documents used in the construction industry and how companies use them for project management. Student is expected to: A) State the various methods used to obtain work in the construction industry; B) Identify the parts of a typical project manual; C) Describe the role of drawings and specifications; and D) Identify the types of contracts used in the	Explain the importance of using and maintaining a record of project correspondence. Describe common construction documents and their importance to effective project management.	

			construction industry.		
Project Planning		Understand the elements that make up the planning phase of project management.	Understand the elements of a project plan. Student is expected to: A) Identify the elements of a project plan. B) Describe the project planning process. C) Explain how a work analysis is performed.	Create a sample project plan.	
Schedule and Resource Acquisition		Understand how resource acquisition and schedules contribute to managing project deliverables.	Understand schedule development and resource acquisition techniques used in the project management process. Student is expected to: A) Describe how to estimate and acquire materials required for a project. B) Explain the use of purchase orders and contracts in acquiring materials. C) Identify the planning requirements for materials, equipment, tools, and labor needed for a project. D) Identify types of project scheduling systems	Develop a plan for acquiring and managing the materials needed for a project. Include samples of the documents that would assist a project manager in acquiring resources and making a schedule. Develop a project schedule using the method specified by the instructor. Describe how you would go about making changes to the schedule.	

Monitoring and Controlling Projects		Understand project management techniques for monitoring and controlling projects.	Develop skills related to cost estimating, project cost awareness, and cost control. Student is expected to: (A) Describe how to perform a cost analysis and its related reporting mechanisms; and (B) Identify tools and techniques for monitoring and controlling projects.	Explain the cost analysis process. Give examples of tools that help project managers evaluate cost and budget considerations. Compare and contrast when these tools are used and for what purpose. Describe methods used to improve productivity. Describe methods used to evaluate productivity. Identify methods used to control materials on a project. Identify methods used to control labor productivity.	