CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Architecture & Construction

Learning that works for Colorado CTE®

Colorado CTE Course – Scope and Sequence

Course Name	Heavy Equipment Operation	Course Details	Credit = 0.5
		Course = 0.50 Carnegie Unit Credit	Prerequisites: Completion of level 3 course CTE Credential: CTE Architecture and Construction
Course Description	This course instructs students in the safe operation of common heavy equipment used in the construction industry. Students will also be introduced to grade reading, laser levels, soils, equipment safety and maintenance, and site layout.		
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 #	17017	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
Safety		Identify safety hazards on a jobsite and demonstrate practices for safe working. Accurately read, interpret, and demonstrate adherence to safety rules, including but not limited to rules pertaining to electrical safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements.	Student is expected to: (A) state guidelines for safe operation, maintenance, and transportation of heavy equipment; (B) understand personal role for safe operation of heavy equipment; and	Explain the importance of heavy equipment safety. Explain the responsibilities and characteristics of a good operator. Demonstrate how to use flags or paddles to control traffic.	

		Describe and apply health and safety regulations.	(C) understand common hand signals or gestures for communication between heavy equipment operators and other construction personnel to control for safety.		
Career Development		Evaluate a wide range of career pathway opportunities for success in architecture and construction careers.	Understand the career opportunities and requirements for careers in heavy equipment operation. Student is expected to: (A) identify career opportunities available to heavy equipment operators; (B) understand the certification or licensure requirements of heavy equipment operators.	Identify career opportunities available to heavy equipment operators and explain the purpose and objectives of an apprentice training program.	
Heavy Equipment		Understand and apply knowledge of heavy equipment machinery and operations.	Apply knowledge of heavy equipment machinery and components to demonstrate heavy	Explain the basic terminology, types, and uses of equipment.	

			equipment operation skills. Student is expected to: (A) identify basic types of heavy equipment; (B) explain the primary uses of basic types of heavy equipment; (C) explain the components that make up the drive and hydraulic systems used on heavy equipment; (D) explain prestart inspections, startup procedures, operational movements, and shutdown procedures for heavy equipment; (E) demonstrate prestart inspections, startup procedures, operational movements, and shutdown procedures for	Demonstrate operation of heavy equipment (as available). Examples include: Construction Tractors Dump Trucks Roller/Compactors Scrapers Backhoe Loaders Excavators Dozers Loaders Forklifts Fixed-Mast Forklifts Telescoping-Boom Forklifts Articulating Forklifts Motor Graders Trenchers Explain how to properly start, operate, and shut down the following types of heavy equipment: utility tractors, dozers, loaders, backhoes, excavators, compaction equipment, motor graders, scrapers, on-road dump trucks, off-road dump trucks, forklifts, skid steers, and trenchers. Identify and explain the systems that make up the drive system used on heavy equipment.	

			heavy equipment and (F) demonstrate proper use of utility tractors and common attachments.	Explain the basics of a hydraulic system and identify hydraulic components.	
Introduction to Grades		Understand how the grading of soil contributes to stability of the site for construction purposes.	Student is expected to: (A) identify types of stakes and markings used in grade work; (B) explain different types of slopes and slope ratios; and (C) layout a cross slope grade.	Identify types of stakes and markings on stakes. Check horizontal and vertical distances of cut and fill slope stakes. Check finish subgrade on a cross slope.	
Introduction to Earthmoving		Understand how heavy equipment operators use equipment to move soil, rock and other earth materials.	Student is expected to: (A) identify basic earthmoving operations; (B) describe common soil stabilization methods; and (C) describe how to safely setup and coordinate earthmoving operations.	Draw a plan for basic earthmoving operations: • Clearing and grubbing • Excavating the foundation • Constructing embankments • Backfilling • Compacting Lay out a basic earthmoving operation. Identify and select the proper equipment for a given earthmoving operation.	
