

Heavy Equipment Operation and Maintenance



Work outdoors and always be part of something big!



Prepare for a commercial driver's license (CDL) and learn skills required by heavy equipment operators for construction, landscaping and highway industries, as well as maintenance and repair of construction-related equipment.

Units of Study

- Basic Operating Techniques
- Orientation to the Trade
- Identification of Heavy Equipment
- Introduction to Hand & Power Tools
- Welding/ Oxy-Acetylene Torching
- Preventative Maintenance of Heavy Equipment
- Career and Financial Management
- Career Exploration
- Basic Employability & Leadership Skills
- CDL General Knowledge Exam Prep
- CDL Airbrake Prep
- Certified Excavator Program Training

Integrated Academics

- English

Licensing / Industry- Based Certifications

- American Red Cross First Aid/CPR/AED Certification
- NCCER Certifications for Core and Level 1 Heavy Equipment Operations Modules
- OSHA 10 Construction Industry
- Dig Safely New York, Inc. Certified Excavator Program (CEP) in Safe Digging Best Practices
- Prepare for NYS CDL Class B Permit Exam

Work-Based Learning

CTE programs bring students into the workplace for real life experiences. Businesses that supports our Heavy Equipment Operation and Maintenance program:

- Brodner Equipment
- The Dolomite Group
- Homesteads for Hope
- Monroe County Parks
- Monroe Tractor
- Spencerport Volunteer Fireman's Assoc.

Articulation Agreements

Alfred State



Career Paths

All CTE programs correlate to many career paths.

↓ Start Here

- Equipment Operator
- Heavy Duty Mechanic Assistant

Go Here ↓

with more education & experience

- Site Engineer
- Project Estimator
- Land Developer

Explore more:

<https://www.careerzone.ny.gov/>
<https://www.onetonline.org/find/>



WEMOCO Career & Technical Education Center
Monroe 2-Orleans Board of Cooperative Educational Services
Monroe2BOCES.org/cte 585-352-2471
3589 Big Ridge Road, Spencerport, New York 14559



Heavy Equipment Operation and Maintenance

Employability Profile

Work-Related Skills

Productivity and Accountability	_____
Follows procedures to meet expectations and deadlines	_____
Displays consistent work performance and quality of work	_____
Flexibility and Adaptability	_____
Works effectively in varied roles and responsibilities	_____
Responds well to and implements feedback	_____
Initiative and Self-Direction	_____
Identifies, prioritizes, and completes tasks without direct oversight	_____
Seeks to learn and develop new knowledge and skills	_____
Leadership and Responsibility	_____
Leverages strengths of others to accomplish a goal	_____
Takes ownership of one's work, performance, behavior, and actions	_____
Communication	_____
Articulates thoughts and ideas clearly and effectively through speaking and writing	_____
Practices active listening skills	_____
Collaboration	_____
Works effectively with others	_____
Open and responsive to new and diverse perspectives	_____
Critical Thinking and Problem Solving	_____
Asks questions to lead to better solutions	_____
Identifies possible options and their outcomes	_____

Orientation to the Trade

Displays characteristics of a good operator	_____
Uses trade terminology	_____
Explores careers in the trade	_____

Introduction to Hand Tools

Identification of hand tools	_____
Selection of hand tools	_____
Proper use of hand tools	_____
Care of hand tools	_____

Basic Safety

Use PPE (Personal Protective Equipment)	_____
Identify workplace hazards	_____
Read and interpret MSDS (Material Safety Data Sheets)	_____
Dress appropriately for the job and conditions	_____
Select and use fire extinguishers	_____
Use proper hearing protection	_____
Use proper lifting techniques	_____

Basic Communication Skills

Speak in front of a group	_____
Use of hand signals	_____
Use of electronic communication devices	_____
Write legibly	_____

Introduction to Construction Math

Add, subtract, multiply, and divide whole numbers and decimals	_____
Measure distance with a tape measure and a wheel	_____
Determine volume of an excavation	_____
Determine rise or fall with a transit	_____
Determine rise or fall with a laser	_____

Introductory Skills for the Crew Leader

Estimate materials for a job	_____
Select equipment for a job	_____
Lead a crew to complete a project	_____

Introduction to Power Tools

Select the proper power tool for the application	_____
Inspect the power tool for safety	_____
Use the power tool safely	_____
Demonstrate proper maintenance of power tools	_____

Identification of Heavy Equipment

Identify various types of equipment	_____
Select the proper machine to match the job	_____

Basic Operational Techniques

Use personal protective equipment	_____
Mount and dismount equipment using 3 points of contact	_____
Start, warm-up and shut down various types of heavy equipment	_____
Perform pre-operational walk around inspection	_____
Accurately complete daily pre-op check sheet	_____
Log equipment usage	_____
Perform basic operational movement	_____

Advanced Operational Techniques

Calculate cycle time	_____
Interpret accident reports	_____
Inspect a job-site for safety	_____

Grades

Match types of stakes to their correct usage	_____
Check finish subgrade on a cross slope	_____
Check horizontal and vertical distance of cut and fill slope stakes	_____

Backhoes

Perform basic maneuvers on a backhoe	_____
Trench to +/- .2 ft with a backhoe	_____
Load a truck with a backhoe	_____
Backfill an excavation with a backhoe	_____
Perform preventive maintenance on a backhoe	_____

Loaders

Perform basic maneuvers with various types of loaders	_____
Load trucks in a safe and productive manner	_____
Stockpile material with a loader	_____
Manage loading area between loads	_____

Welding/Oxy-Acetylene Torches

Select and use proper PPE	_____
Set up welding and torching equipment	_____
Strike an arc and run straight consistent beads with an arc welder	_____
Make straight cuts in various thicknesses of steel with a cutting torch	_____
Shut down welding and torching equipment properly	_____

Excavators

Perform basic earthmoving and excavation operations with an excavator	_____
Trench to +/- .2 ft with an excavator	_____
Bench load a truck with an excavator	_____

Bulldozers

Perform basic earthmoving and excavation operations with a dozer	_____
Grade to +/- .2 ft with a dozer	_____
Cut a drainage swail with a dozer	_____

Dump Trucks

Safely operate a 1 ton and a large dump truck	_____
Back-up using only mirrors	_____
Inspect load for balance, weight, and hazards before moving the truck	_____
Back up and dump a load in a designated spot	_____

CDL General Knowledge

Perform a 7 step pre-trip inspection	_____
Operate trucks with manual and automatic transmissions	_____
Parallel park a commercial motor vehicle	_____
Straight line back a commercial motor vehicle	_____
Back a truck using mirrors	_____
Pass a sample CDL General Knowledge test with a minimum score of 80	_____

CDL Air Brakes

Operate a truck with air brakes	_____
Perform preventive maintenance on an air brake system	_____
Pass a sample CDL air brake endorsement test with a minimum score of 80	_____

Preventive Maintenance

Locate service intervals for equipment	_____
Schedule maintenance for equipment	_____
Perform preventive maintenance on a piece of equipment	_____
Follow procedures in maintenance manuals	_____
Log maintenance performed on service logs	_____