Heavy Equipment Operation I
Course Design
2008-2009

Course Information
Organization
Eastern Arizona College
Division
Industrial Technology Education
Course Number
TEC 150
Title
Heavy Equipment Operation I
Credits
6
Developed by
B. Stephen Cullen, Ph.D.
Lecture/Lab Ratio
3 Lecture/6 Lab
Transfer Status
Non-transferable
Activity Course
No
CIP Code
49.0202
Assessment Mode
Pre/Post Test (50 Questions/50 Points)
Semester Taught
Upon Request
GE Category
None
Separate Lab
No
Awareness Course
No
Intensive Writing Course
No

Prerequisites
Must be at least 18 years of age at the start of the class; Present proof of valid motor vehicle operator's license; Present proof of complete drug screen indicating negative results for drugs; Must have successfully completed either OSHA 10 or MSHA Training. Submit documentation of the prerequisites with the completed Proof of Prerequisites Form to the Records and Registration Office.

Educational Value
This course represents an opportunity for students who aspire to gain knowledge in the use of heavy equipment.

Description
This course is an introduction to the use of heavy equipment with emphasis on safety, preventive maintenance, and grade stake interpretation.
Supplies
Hard Hat
Steel Toe Boots
Safety Glasses
Notebook
Access to computer

Competencies and Performance Standards

1. Apply safety rules that pertain to heavy equipment operation.

   **Performance Standards**
   
   Student will demonstrate competence by
   
   o discussing the importance of practicing job safety.
   o listing the rules for job safety.
   o practicing the rules of job safety.
   o gaining the knowledge of the Occupational Safety and Health Act of 1970.
   o understanding the elements and equipment of personal protection.

   Student performance will be successful when he/she
   
   o works in a safe environment that prevents harm to self and others.
   o lists in writing the 10 reasons for practicing safety.
   o identifies safeguards used in a highway construction work zone.
   o states the purposes of signs, tags, barricades, and lockout/tagout devices when working on construction sites.
   o outlines the procedure for reporting accidents.
   o identifies when the use of solvent should implemented.
   o displays proper use of properly fitting wrenches on nuts and bolts.
   o displays the proper and safe technique for disconnecting power, lock, and tag out machines before performing maintenance.
   o researches on the internet and recites to peers the major components of Occupational Safety and Health Act of 1970.
   o defines OSHA in writing.
   o lists the safety considerations for personal protection.
2. **Identify the various types and uses of heavy equipment.**

*Performance Standards*

*Student will demonstrate competence by*

- identifying the 10 basic types of heavy equipment.
- listing the primary uses of each piece of equipment.
- describing the basic operational guidelines for heavy equipment.

*Student performance will be successful when he/she*

- lists and defines in writing the 10 basic types of equipment.
- outlines in writing when a specific type of equipment is to be used including dump truck, tractor, scraper, bulldozer, backhoe, gradall, motorgrader, loader, excavator, and roller.
- matches terms associated with equipment to the correct definition.
- in writing, outlines the basic operational guidelines for heavy equipment for all ten basic types of equipment.
- performs basic pre-start inspection, startup, operational movement, and shutdown for all ten basic types of equipment.

3. **Perform three different tasks on a motor grader, loader backhoe, and wheel loader or track dozer.**

*Performance Standards*

*Student will demonstrate competence by*

- identifying general guidelines for safe operation and maintenance of heavy equipment.
- identifying general guidelines for safe transportation of heavy equipment.
- explaining the general guidelines for working safety around heavy equipment.
- naming the basic earth moving operations.

*Student performance will be successful when he/she*

- in writing, outlines the general guidelines for the safe operation and maintenance of specific pieces of heavy equipment.
- in writing, outlines the general guidelines that must be used for the safe transportation of heavy equipment.
- identifies the operating controls of a typical tractor, backhoe, loader, scraper, and bulldozer.
- describes, in writing, the different types of transmissions used on tractor, backhoe, loader, scraper, and bulldozer.
- performs pre-start inspection and maintenance procedures on a typical tractor, backhoe, loader, scraper, and bulldozer.
- starts warms up, and properly shuts down tractor, backhoe, loader, scraper, and bulldozer.
- lists in writing the four basic earth-moving operations including clearing and grubbing, excavation, embankment construction, and backfilling and compacting.
4. Correctly set up a builder's level and explain rod placement reading. Explain one stake marking system.

**Performance Standards**

*Student will demonstrate competence by*
- matching terms associated with grade work to their correct definition.
- matching types of stakes to their correct usage, and explain markings on grade stakes and bench mark (BM) stakes.
- identifying equipment used by the operator to check stakes.
- discussing the meaning of slope ratio.
- distinguishing between backslope and foreslope.
- checking horizontal and vertical distance of cut and fill slope stakes.
- checking finish subgrade on a cross slope.
- checking finish subgrade on a slope.

*Student performance will be successful when he/she, with 100% accuracy*
- matches terms associated with grade work to their correct definition.
- matches types of stakes to their correct usage, and explains markings on grade stakes and bench mark (BM) stakes.
- identifies equipment used by the operator to check stakes.
- gains understanding of the meaning of slope ratio.
- distinguishes between backslope and foreslope.
- checks horizontal and vertical distance of cut and fill slope stakes.
- checks finished subgrade on a cross slope.
- checks finished subgrade on a slope.

5. Maintain records of equipment for maintenance and costs.

**Performance Standards**

*Student will demonstrate competence by*
- reciting the responsibilities of the heavy equipment operator as applied to preventive maintenance.
- listing the six basic systems.
- listing the seven basic time intervals for preventive maintenance.
- listing when an operator should inspect equipment.

*Student performance will be successful when he/she*
- in writing, outlines that the responsibility of the operator relative to preventive maintenance and knowledge of the procedures to be used on each piece of equipment.
- defines with 100% accuracy the following terms: alemite, drag link, grease, honing stone, kilopascal (kPa), lubricant, packing gland, SAE Number, sediment, sender unit, service meter reading (SMR's), steering linkage, and worm gear.
- list with 100% accuracy the six basic systems of heavy equipment including power, drive-train, electrical, steering suspension, and braking system.
- list with 100% accuracy the seven basic time intervals for preventive maintenance.
including daily, weekly, bi-weekly, monthly, three months, six months and annual.

6. **Safely operate water truck for dust control and compaction.**

*Performance Standards*

*Student will demonstrate competence by*

- describing the correct methods to load water into water truck.
- describing correct method to engage PTO and unload water from water truck.
- demonstrating correct methods to load and unload water from water truck.

*Student performance will be successful when he/she*

- describes, in writing, and performs the correct methods to load water into water truck.
- describes, in writing, and performs the correct methods for engaging PTO and unload water from water trucks.
- performs the proper and safe methods for loading and unloading water from a water truck.
**Types of Instruction**
Lecture and field training

**Grading Information**

**Grading Scale**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100-90%</td>
</tr>
<tr>
<td>B</td>
<td>80-89%</td>
</tr>
<tr>
<td>C</td>
<td>70-79%</td>
</tr>
<tr>
<td>D</td>
<td>60-69%</td>
</tr>
<tr>
<td>F</td>
<td>Below 60%</td>
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