ATOE-1650: GRADERS AND PLANS

Cuyahoga Community College

Viewing: ATOE-1650 : Graders and Plans

Board of Trustees:
September 2025

Academic Term:
Fall 2025

Subject Code
ATOE - Appd Ind Tech-Operating Engin.

Course Number:
1650

Title:
Graders and Plans

Catalog Description:
Introduction to graders operations, safety information fundamentals, terminology and various support grader operations, pre and post operations, methods of finish grading, and fundamentals of construction leveling. Topics include terminology of laser and laser machine controls; proper set-up procedures; safe work practices in the use of lasers and components of laser machine controls; and common highway plans for construction projects including introduction to basic plans, their purpose, and learning how to interpret them.

Credit Hour(s):
2

Lecture Hour(s):
2

Lab Hour(s):
0

Requisites

Prerequisite and Corequisite
Departmental approval: Admissions to Operating Engineering Technology apprenticeship program.

Outcomes

Course Outcome(s):
N/A

Objective(s):
1. Explain safety information.
2. Demonstrate and identify pre and post operations checks.
3. Explain/Demonstrate safety operation procedures.
4. Explain various methods of support grader operations.
5. Identify various technical methods of finish grading.
6. Calculate slope of a given area.
7. Set up level only laser.
8. Demonstrate correct setup for placement of laser transmitter.
9. Explain the use of receivers and placement of slight display arrays.
10. Explain functions of a dual slope transmitter.
11. Identify plan items.
12. Explain legends and scales.
13. Read and utilize schematic plan, general notes and general summary.
14. Read and interpret normal jobsite layouts.

15. List and explain the eight basic construction steps.
16. List stages of site preparation and describe.

Methods of Evaluation:

1. Quizzes
2. Exams
3. Classroom participation

Course Content Outline:

1. Safety information
   a. Warning signs and labels
      i. hazard signs - "safety alert symbol"
      ii. location of warning alert signs
   b. General hazard information
      i. maintenance performance of machine
      ii. pressure air and fluid penetration
      iii. asbestos information
   c. Safety operation procedures
   d. Monitoring systems and cab features
   e. Gauges and indicators
   f. Switches - light, panel dimmer, and windshield wiper
   g. Backup alarm
   h. Heating, air condition controls and operations {if equipped}
   i. Temperature variable controls
   j. Defrost fans {if equipped}
   k. Machine, steering and equipment controls
   l. Machine operations
2. Operation techniques
3. Machine parking
4. Transportation and towing information
5. Site preparation
   a. stages of site preparation
      i. clearing and grubbing
      ii. stripping
      iii. rough grading
      iv. fine grading
   b. Safety measures
   c. Definition of plane
      i. concept of the laserplane system
         1. demonstration of laserbeam(1000" radius
         2. using plane of light concept in site preparation
      ii. sheet number
         1. components of laser survey methods
         2. level only laser
            a. receiver - beam detector
            b. slope
            c. dual slope laser
            d. calibration
            e. laser transmitter placement
            f. machine set-up
   d. Bladepro motor grader control system
   e. Laser maintenance
6. Fundamentals of construction leveling
   a. The eight basic construction steps
      i. plot plan
      ii. site preparation

iii. foundation
iv. superstructure
v. upper floors
vi. interior layout
vii. exterior
viii. interior systems
b. Measurement and controls
i. lines
ii. distance
iii. elevation
iv. electronic level
7. Title sheet
a. Identification
i. county
ii. route
iii. section number
b. Federal project designation
i. standard identification box
ii. sheet number
c. Conventional signs
d. Index of sheets
e. Line data
f. Location map and scales
g. Standards and specifications
h. Notes and approvals
8. Profile sheets
a. General and scales
b. Profile grade point
c. Drainage and notes
d. Slopes and grades
i. Slopes
1. use of rates explained
2. use of ratios explained
ii. grades
e. Vertical curves

Resources

International Union of Operating Engineers, Local #18--Apprenticeship and Training. "Grader Training for Operating Engineers, Second Year"

International Union of Operating Engineers, Local #18--Apprenticeship and Training. "Laser Training for Operating Engineers, Student Workbook"

International Union of Operating Engineers, Local #18--Apprenticeship and Training. "Laser Training for Operating Engineers, Second Year Student Workbook"

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