Summer 9-2004

**HEO 151T.01: Service and Maintenance**

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*University of Montana - Missoula*

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COURSE NUMBER AND TITLE: HEO151T SERVICE AND MAINTENANCE

DATE REVISED: Fall 2003

SEMESTER CREDITS: 2

CONTACT HOURS PER SEMESTER: 75
  Lecture hours per week 1
  Lab hours per week 2
  Shop hours per week 2

PREREQUISITES: None

INSTRUCTOR NAME: Tim Lytle
E-MAIL ADDRESS: Tim.Lytle@mso.umt.edu
PHONE NUMBER: 406-243-7643
OFFICE LOCATION: West Campus 3639 South Avenue West
OFFICE HOURS: Regular

RELATIONSHIP TO PROGRAM
Develop student’s knowledge and understanding of mechanical skills needed for light-duty maintenance and service as well as basic mechanical skills necessary to identify major components and their functions and prepare the program’s equipment for field activities.

COURSE DESCRIPTION:
(First half) A study of types of lubricants and their use; the importance and procedures of scheduled and preventive maintenance; safety stands and requirements. (Second half) Basic principals of diesel and gas engines, hydraulics, power trains, undercarriages, and other heavy equipment components.

STUDENT PERFORMANCE OUTCOMES:
Occupational Performance Objectives Life-Long Learning Skill Codes*

Upon completion of this course, the student will be able to:

1. Read, understand, utilize various service BSKL 1,3; THINK 2,6 INFO 1
2. Perform service and maintenance safety   THINK 2,4,6
3. Complete service reports     BSKL 1,2; INFO 1,2,3
4. Work as part of a service team   BSKL4,5; PQ1,2; IPS 1,3,4,5
   THINK 2,3; RSRC 1,3
5. Identify major mechanical    BSKL 1,2; INFO1,2,3
   components and their function
6. Identify and correct minor    THINK 1,2,3,6; INFO1,2,3
   mechanical malfunctions    SYS 1,2; TECH 1,3

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grade:
93% - 100% = A
85% - 92% = B
75% - 84% = C
65% - 74% = D
64% below = F

Grades will be determined by the following:

Lab  40%
Tests 20%
Attendance 20%
Participation 20%

Note:

1. No excuses for absence or late attendance.
2. Missed tests, quizzes, and homework will result in a 0% grade.
   No make-ups.
3. Please bring your hard hat, safety vest, and safety glasses with you to every class. You cannot attend class without them. Coveralls are recommended but not required.

OTHER POLICIES:

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Student course evaluations.
2. Student field performance spring quarter.
3. Program directors evaluation of student performance

REQUIRED TEXT: Machine operator’s manuals (used in HEO146)
SUGGESTED REFERENCE MATERIALS:

Supplies:
1. Hard Hat
2. Safety Vest
3. Safety Glasses

COURSE OUTLINE: (1st Half)

1. Introduction to service
   A. Safety procedures
      1. Equipment
      2. Location
      3. Shop rules
      4. Blocking equipment
   B. Service Manuals
      1. Periodic service
      2. Maintenance procedures
      3. Service area locations
   C. Oils and fluids
      1. Engine
      2. Transmission (manual and powershift)
      3. Hydraulic
      4. Differentials and final drives
      5. Brakes
      6. Power steering
   D. Filters
      1. Oil
      2. Air
      3. Hydraulic
      4. Fuel
      5. Coolant
      6. Transmission
      7. Final drive
   E. Cooling systems
      1. Coolants and radiators
      2. Oil Coolers
      3. Transmission coolers
      4. Air coolers
   F. Electrical systems
      1. Safety
      2. Batteries
      3. Starters
      4. Alternators/generators
5. Lights/special equipment
G. Miscellaneous
   1. Tires
   2. Tracks
   3. Maintenance w/o service manuals (rules of thumb)

II. Service of all equipment
   A. Usage and hours of machine
      1. 10 hour service
      2. 200 hour service
      3. 500/1000 hour service
   B. Cleaning of equipment
   C. Hand and power tools
      1. Safety
      2. Wrenches
      3. Impact tools
      4. Hammers
      5. Chisels
      6. Drills
      7. Grinders
   D. Oil filter change
      1. Tools
      2. Procedures
   E. Hydraulic service
      1. Tools
      2. Procedures
   F. Power train service
      1. Tools
      2. Procedures
      3. Zerk fittings
      4. Grease guns
      5. Air brake service

III. Periodic adjustments
   A. Clutches
   B. Belts
   C. Track adjustment
   D. Wheels and tire pressures
   E. Control linkage

IV. Service for specific equipment
   A. TD15 dozer, TS14 Scraper, W24C End Loaders; 310A Backhoe, T500M Grader; 710-A Grader, Dump Trucks, 613 Scraper; MRS 14 Scraper; Vibratory Roller, HEO Support Vehicles.
COURSE OUTLINE: (2ND half)

I. Fundamentals of heavy equipment
   A. Using operator, parts, service and maintenance manuals
   B. Principles of gasoline engines
   C. Diesel engine principles
   D. Power train principles
   E. Hydraulic system principles
   F. Electrical system principles

II. Component identification and inspection
   A. Engines
   B. Starters
   C. Alternators
   D. Pumps
      1. Water
      2. Power steering
      3. Fuel
   E. Transmissions
   F. Differentials
   G. Drive lines
   H. Brake systems
   I. Hydraulic systems
   J. Cutting edge and teeth replacement
   K. Undercarriages

III. Equipment services and repair
   A. Dependent on needed repairs of equipment – will vary from year to year.
   B. Every student will receive basic, hands-on knowledge of engines, 
      Power trains, starters, transmissions, differentials, and hydraulic 
      systems.