Fall 9-1-2020

DST 135.B01: Power Trains

James D. Headlee

University of Montana, Missoula, jim.headlee@mso.umt.edu

POWER TRAINS COURSE SYLLABUS
DST 135
FALL 2020

DET 135
CREDITS 7
PREREQUISITIES-NONE

TIMES:
9:30-12:00 M-THURSDAY
12:30-3:00 M-THURSDAY

COURSE DESCRIPTION:
Drive train components used in light and heavy-duty trucks and related heavy equipment. Clutches, manual transmissions, differentials, and final drives are studied. Other topics such as failure analysis of parts including bearings and shafts are also studied. Air systems of multi box type transmissions will be looked at in depth along with troubleshooting those types of systems. Auto-shift style transmissions will also be studied.
Each student must have the required tools from the first year tool list or they will not be allowed in the class-this includes hearing protection and eye protection.

COURSE OBJECTIVES:
1) Work in a safe manner around heavy equipment
2) Explain failure analysis principles of gears, shafts, bearings, and seals
3) Perform rebuilding procedures found on heavy equipment and large truck power train components.
4) Perform common test procedures as prescribed by the manufacture
5) Understand the principles of power train components.
6) Identify, rebuild, troubleshoot, and maintain the following components:

    a. Clutches
    b. Standard transmissions/auxiliary transmissions
    c. Bearings and seals
    d. differentials
    e. drivelines and CV joints
    f. identify and use specialty tools

REQUIRED TEXT: MEDIUM/HEAVY DUTY COMMERCIAL VEHICLE SYSTEMS BY CDX AUTOMOTIVE

COURSE OUTLINE:

A. Clutches
    1. Principles of clutch operation
    2. Types of clutches
    3. Push-pull type clutch operation
    4. Clutch adjustment
    5. Clutch removal, repair, and installation
    6. Clutch linkage repair and adjustments

B. STANDARD TRANSMISSIONS
    1. Transmission styles, sliding gear, collar shift, synchromesh
    2. Single countershaft
    3. Twin countershaft
    4. Transmission failures
    5. Transmission maintenance
    6. Air shift systems
    7. Bearings
    8. Seals
    9. Gear, shaft failures
    10. Ratios

C. DRIVE SHAFTS
    1. Construction and operation
    2. U-Joint working angles
    3. Driveshaft phasing
    4. Driveline rebuilding

D. DIFFERENTIALS
    1. Single ratio
    2. Double ratio
    3. Axle rebuilding
    4. Axle failure analysis
    5. Lubrication
    6. Axle adjustments

ATTENDANCE:

Attendance will be taken at least once a day-sometimes more, each student will be in class on time and ready to go. After two unexcused absence's the final grade will start dropping one letter for each unexcused absence thereafter until a grade of F is reached. Being late to class will count the same as being unexcused.
(call:243-7648 if you are running late or have an emergency)

SAFTEY:

Students shall follow all West Campus safety policies and each student will always work in a safe manner or **removal from class will result!!!**
Safety Glasses must be worn when working around the press or anytime your eyes could be injured!! **Hearing protection** is required and will be worn when needed!!

GRADING:

Lecture counts for 50% of your final grade. You must pass lecture with a **grade of C-** or better or you will not pass the class.

Lab counts for 50% of your final grade. Work habits, attitude, attendance, **quality of work** will be figured into the lab grade. Each completed lab project must have the ***instructor signed*** job sheet for the project to count toward the lab points; this is to be signed at project ***completion time!*** Please do not ask to have job sheets signed after completion. If the lab project is not done to the instructor's satisfaction you will be asked to repeat the project!!!!! Your lab grade can only raise your final grade one-letter. You must pass Lab with a grade of C- or better or you will not pass the class.

LAB PROJECTS:

Minimum requirements require at least **one** each of the following projects be completed and signed off on a job sheet at time of completion, you must do quality work!! Or the job sheet will not be signed off-this means all parts laid-out in an orderly fashion, no hammering apart or together, tools put away when finished with them, paper work done in a neat and orderly fashion!!! You can not have more than TWO (2) lab sheets of any one thing count toward your final lab grade-except where noted.
LAB PARTNERS: You will be assigned a lab partner-however some of the requirements will be done on an individual basis-copying of lab sheets will result in an **F** for the class!!!

DO NOT COPY YOUR LAB PARTNERS JOB SHEET!!!

1) **CLUTCHES:**
   a. Clutch install to flywheel (1 angle spring,1 solo) (2)
   b. Flywheel/bellhousing check (2)
   c. Clutch adjustment (2 must be angle spring-one of your choice for a total of 3)

2) **TRANSMISSIONS:**
   a. Twin countershaft 2 speed auxiliary (1)
   b. Twin countershaft 3 or 4 speed auxiliary (1)
   c. Autoshift single countershaft/other (2)
   d. Shift tower rebuild (2)
   e. Air system (2)

3) **DRIVLINES:**
   a. U-joint, driveline R&R (2)
   b. Driveline angle check (2)

4) **DIFFERENTIALS:**
   a. Single speed (2)
   b. Differential with power divider (2)
   c. Other (3)

LAB POINTS:

Use the following scale to figure your lab grade using your
INSTRUCTOR SIGNED LAB SHEETS.
(One signed sheet equals one point)

24-26=A
21-23=B
18-20=C
15-17=D
0-14=F

NOTE BOOK:

Each student will be require to hand in a notebook (3 ring binder) at the end of this class containing all handouts in order and all signed job sheets in order of completion located in a separate section. Do not put unsigned job sheets in the notebook. Missing lab sheets will not count toward your lab grade. The overall notebook will count toward your final grade.