

Fall 9-1-2005

DET 135T.01: Power Trains

Unknown

University of Montana - Missoula

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POWER TRAINS COURSE SYLLABUS

FALL 2005

DET 135
CREDITS 7
PREREQUISITIES-NONE

TIMES:

10:00-12:00/1:00-3:00 MWF

9:00-12:00/1:00-3:00 T TR

3:00-4:00 T TR OPEN LAB

(attendance not taken for open lab)

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 such as 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.

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

SUGGESTED TEXT: Heavy Duty Truck Systems (3rd edition)
By Norman Scharff, Corinchock

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.

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!!

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. (4 Tests)

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. (2-3 days later) Not having this job sheet signed **VOIDS** the lab point. If the lab project is not done to the instructors satisfaction you will be asked to repeat the project!!!! Your lab grade will only raise your final grade one-letter grade. 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 THREE (3) 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)
- b. Flywheel/bellhousing check (60 series, N-14, 3406E, 466E only)
- c. Clutch adjustment (2 must be angle spring)

2) TRANSMISSIONS:

- a. Single countershaft (1 ONLY)
- b. Twin countershaft 2 speed auxiliary
- c. Twin countershaft 3 or 4 speed auxiliary
- d. Shift tower rebuild
- e. Air system diagnosis

3) DRIVELINES:

- a. U-joint, driveline R&R
- b. Driveline angle check

4) DIFFERENTIALS:

- a. Single speed
- b. Two speed
- c. Power divider/differential (1 pt. ea.)
- d. Axle R&R

LAB POINTS:

Use the following scale to figure your lab grade using your

INSTRUCTOR SIGNED LAB SHEETS.

(One signed sheet equals one point)

23-25=A

20-22=B

17-19=C

14-16=D

13-0=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, also missing lab sheets will not count toward your lab grade. The overall notebook will count toward your final grade.