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### DST 235.01: Advanced Power Trains

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**THE UNIVERSITY OF MONTANA  
MISSOULA COLLEGE  
INDUSTRIAL TECHNOLOGY DEPARTMENT  
DIESEL TECHNOLOGY PROGRAM**

**COURSE SYLLABUS**

**COURSE NUMBER AND TITLE:** DET235T Advanced Power Trains

**DATE REVISED:** Spring 2015

**SEMESTER CREDITS:** 2

**CONTACT HOURS PER SEMESTER:** 75 hours

**PREREQUISITES:** None

**INSTRUCTOR:** Jim Harris

**PHONE NUMBER:** 406.243.7649

**E-MAIL ADDRESS:** [jim.harris@umontana.edu](mailto:jim.harris@umontana.edu)

**HOURS:** Monday-Friday 9:00 am to 12:00 pm 1:00 pm to 4:00 pm

**OFFICE LOCATION:** Missoula College West Campus

**COURSE DESCRIPTION:** A continuation of DET135T Power Trains with a major emphasis being placed on heavy automatic transmissions, torque converters, and powershift transmissions. Component review, troubleshooting, and repair will be covered in depth.

**COURSE OBJECTIVES:** Student will be able to:

- A. Explain power flow and fluid flow through single and double phase torque converters.
- B. Test, remove and repair single and double stage torque converters.
- C. Explain planetary power flow through automatic style transmissions, including hydraulic flow and clutch pack apply procedures.
- D. Troubleshooting using common gauge type test equipment.
- E. Identify problems found during the troubleshooting phase, and make the necessary repairs as needed.

**SUGGESTED TEXT:** Heavy Duty Truck Systems (3<sup>rd</sup> edition) by Ian Norman & Robert Scharff & John Corinchock

**GRADING:**

**LECTURE:** Counts for 50 % of your final grade-this will include tests, quizzes, work ethics, attitude, and attendance. If you have an overall score of 92% or better in lecture at finals time you do not have to take the final-your lecture grade will be an A for lecture.

**LAB:** Counts for 50% of your final grade-this will include lab sheets signed off by the instructor at the time of completion-Please do not ask for sign offs after the completion of the current project and the start of another. I will not sign the sheet unless prior arrangements have been made!! Attitude, Work Ethics and Attendance will also influence your lab grade. Your lab grade can only raise your final grade one letter grade overall.

**NOTEBOOK:** Each student will be required to keep a three ring type notebook to contain the following: Handouts as given by date, class notes, and lab job sheets signed by the instructor in order of completion.

**ATTENDANCE:** Each student will have 3 free days during the semester. After the 3 days are used each unexcused absence after will drop the final grade one letter until a grade of F is reached. Being late counts the same as being absent.

**CELL PHONES:** Cell phones are to be turned off unless you are expecting an emergency type call. Listening to music during class time will not be tolerated!!!

## **COURSE OUTLINE:**

### **A. Torque Converters**

1. Principles of operation, differences between a torque converter and fluid coupling.
2. Single stage converters vs. two state converters, and where they are used.
3. Converter oil flow paths-single vs. double.
4. Disassembly, repair, and assembly procedures.
5. Troubleshooting torque converters using common diagnostic test equipment.

### **B. Automatic Transmissions:**

1. Review of planetary gearing.
2. Powerflow through Allison transmissions.
3. Diagnosis of Allison style transmissions using common transmission test equipment.
4. Making necessary repairs after diagnosis is made following manufactures procedures.
5. Hydraulic principles as applied to automatic transmissions.

### **C. Powershift Transmission:**

1. Difference between automatic and powershift transmissions.

2. Clutch pac operation.
3. Power flow principles through a drop style transmission.
4. Troubleshooting and repair using common diagnostic test equipment.
5. Common rebuild procedures as outline by manufacture.