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DET 235T.01: Advanced Powertrains

Carl S. Scott

The University Of Montana

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**THE UNIVERSITY OF MONTANA MISSOULA
COLLEGE OF TECHNOLOGY
DEISEL TECHNOLOGY DEPARTMENT**

COURSE SYLLABUS

COURSE NUMBER AND TITLE: D.E.T. 235T ADVANCED POWERTRAINS

DATE REVISED: SUMMER 1999

SEMESTER CREDITS: 2

CONTACT HOURS PER SEMESTER: [For administrative purposes only]

Lecture hours per week: 4

Lab hours per week: 6

Clinical/internship hours per week:

PREREQUISITES: D.E.T 135T POWER-TRAINS

INSTRUCTOR : Carl S.Scott

E-MAIL: Carl.Scott@mso.umt.edu

PHONE: 243-7649

OFFICE LOCATION: WEST CAMPUS

OFFICE HOURS: MONDAY- FRIDAY 8:00 AM-9:00 AM

RELATIONSHIP TO PROGRAM(S): Advanced power-trains contributes to the objectives of the Diesel Technology program by increasing the students knowledge of the operation, maintenance and repair of automatic, semi-automatic transmissions and torque converters.

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

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives

Life-Long Learning Skill Codes*

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

- | | |
|--|---|
| 1. Explain the power flow through a torque converter. | 1. THINK: 3,5,6 BSKL:15, 18
INFO 1,2, SYS 1 |
| 2. Remove and repair single and double stage torque converters. | 2. TECH 3 THINK 2,3,6
INFO 1,2,3, |
| 3. Explain the power flow through semi-automatic style transmissions, including hydraulic flow and clutch pack application procedures. | 3. THINK 3,5,6 BSKL 15,18
INFO 1,2 SYS 1 |
| 4. Troubleshoot using common gauge test equipment. | 4. TECH 1,2,3, THINK 2,3,6 |
| 5. Identify problems found during the troubleshooting phase and make the necessary repairs as needed. | 5. THINK 1,2,3,6, INFO 1,2,3
SYS 1,2 TECH 1,2,3, |

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Lecture and Lab tests are given at the end of each chapter covered.

ATTENDANCE POLICY (if any): DET prefix classes all have the same attendance policy available on request.

ATTENDANCE and GRADING POLICY

The following guidelines will be used pertaining to attendance and grading in the classroom, and lab areas in all Diesel Technology classes using the D.E.T. prefix.

The reasoning behind a attendance policy is to make the students aware of the importance of attendance at school, and with their employers in the future.

DAYS ABSENT WILL DEDUCT FROM THE FINAL GRADE AS FOLLOWS:

- 3- days----- no deduction
- 4th day----- 1% point
- 5th day----- 2% points
- 6th day----- 6% points
- 7th day----- 10% points
- 8th day----- 16% points
- 9th day----- 18% points
- 10th day----- 20% points
- 11th day----- 25% points
- 12th day----- 30% points

GRADING POLICY:

- 100-90 (A)
- 80---89 (B)
- 70---79 (C)
- 60---69 (D)
- 59 and below (F)

TEST MAKE UP:

There will be no test make up. If you are late, you will not take the test. All students will start testing at the same time.

BEING LATE FOR CLASS:

Any student that is late for class will be counted as absent.

ATTENDANCE and GRADING POLICIES:

Any changes to the attendance or grading policies will be handled on a one to one basis with the student as required.

FINAL GRADES:

Final grades will be determined by the following. The lab grade will only raise, or lower the final grade one letter grade. To receive a final grade of (A), you must have a grade average of (A) on tests, and written papers. In order to receive a passing grade of (C), the student must achieve a minimum grade of (C) in lecture and lab.

STUDENTS SIGNATURE : _____

D.E.T. COURSE: _____

DATE: ____/____/____

OTHER POLICIES (if any): [For students only]
NONE

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:
All student comments are taken into consideration at the end of the course including the student evaluation, also any new technology found or gained by attending any factory updates will be used to increase the amount of knowledge passed on to the student. Tests, both lab and lecture are used to evaluate the course structure and reorganization as needed.

REQUIRED TEXT:

Heavy Duty Truck Systems (2nd edition)
 By Ian Andrew Norman. Robert Scharff. John A. Corinchock

SUGGESTED REFERENCE MATERIALS:

Allison Transmission MT600 service manual

SUPPLIES:

Hand tools and test gauges

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. Power flow 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 TRANSMISSIONS:

1. Difference between automatic and semi-automatic power shift transmissions.
2. Clutch-pack operation.
3. Power flow principles through a drop style transmission.
4. Troubleshooting and repair using common diagnostic test equipment.
5. Common rebuild procedures as outlined by manufacture.

*Life-Long Learning Skills Codes and Numbers	
FOUNDATIONAL SKILLS:	COMPETENCIES:
<p>BASIC SKILLS [BSKL]</p> <ol style="list-style-type: none"> 1. Reading 2. Writing 3. Arithmetic/Mathematics 4. Listening 5. Speaking 	<p>RESOURCES [RSRC]</p> <ol style="list-style-type: none"> 1. Manages Time 2. Manages Money 3. Manages Materials and Facility Resources 4. Manages Human Resources
<p>THINKING SKILLS [THINK]</p>	<p>INTERPERSONAL SKILLS [IPS]</p> <p>Participates as Member of a Team</p>

<ol style="list-style-type: none"> 1. Creative Thinking 2. Decision Making 3. Problem Solving 4. Mental Visualization 5. Knowing How to Learn 6. Reasoning <p>PERSONAL QUALITIES [PQ]</p> <ol style="list-style-type: none"> 1. Responsibility 2. Self-esteem 3. Sociability 4. Self-management 5. Integrity/Honesty 	<ol style="list-style-type: none"> 1. Teaches Others 2. Serves Clients and Customers 3. Exercises Leadership 4. Negotiates to Arrive at a Decision 5. Works with Diversity <p>INFORMATION [INFO]</p> <ol style="list-style-type: none"> 1. Acquires and Evaluates Information 2. Organizes and Maintains Information 3. Interprets and Communicates Information 4. Uses Computers to Process Information <p>SYSTEMS [SYS]</p> <ol style="list-style-type: none"> 1. Understands Systems 2. Monitors and Corrects Performance 3. Improves and Designs Systems <p>TECHNOLOGY [TECH]</p> <ol style="list-style-type: none"> 1. Selects Technology 2. Applies Technology 3. Maintains and Troubleshoots Technology
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