Text: Any Drivetrains textbook published within the past 10 years.

Dates: April 4th through May 6th; 1pm to 4:50pm; M, Tu, Th, F

Classroom: TEC 174

Instructor: Sean Boyle
jeepster@siu.edu

Office Hours: M, Tu, Th, F 11:30am to 1pm. If I’m not in my office, check the drivetrains lab and classroom.

Course Description: What makes up the drivetrain? In the beginning, every car was sold with a standard transmission (manual). The first automatic transmission was the Hydra-Matic Drive introduced in the 1940 Oldsmobile. By the 1960’s, most of the domestic cars were equipped with automatic transmissions. Automatic transmissions differ from standard transmissions in that the shifts are automatically performed through hydraulics. But the drivetrain isn’t only made up of automatic and manual transmissions. Drivetrains also include the clutch system, manual or automatic transaxles, differentials or final drives, transfer cases, driveshafts, and axles. A great deal of care is taken during the design of the drive train. The different “gearing” of the drive train ultimately defines when the vehicle is going to produce the maximum torque, horsepower, and fuel mileage. In this course, we will identify all the components of the drive train, go into detail on how each part of the drive train works, and perform hands-on work to the various parts of the drive train. The course will include a detailed study of the following:
- Rear Axle Assemblies
- Manual transmissions
- Manual transaxles
- Driveshafts and U-joints
- Clutch assemblies
- Four-wheel drive transfer cases and components

Objectives: Upon successful completion of Automotive Drivetrains, the student will:

1. Identify the basic components of the drive train, including the manual transmission and transaxle, the clutch system, drive shafts and axles, transfer cases, and differentials.
2. Diagnose and repair transmissions and transaxles, clutch systems, axles and drive shafts, differentials, and transfer cases.
3. Identify the basic operating principles of manual transmissions and transaxles.
4. Identify the basic operating principles of differentials.
5. Identify the basic operating principles of four-wheel drive systems.

Grading: The student’s grade is determined from lab activities, written tests, performance tests, assignments, lab, and attendance. The overall grade can be influenced positively and negatively by their lab activities, attendance, participation, and enthusiasm. The percentage breakdown is as follows:

A = 93% to 100%
B = 87% to 92%
C = 76% to 86%
D = 70% to 75%
F = 69% and Lower

**Lab:** The Lab Activities, which involve completing worksheets is worth 60 points max. You will be expected to complete worksheets on rear axles, transmissions, transaxles, u-joints, working angles, and cv joints. The paperwork is graded for thoroughness. If you fail to complete all worksheets by the end of the course, you will lose 10 points per worksheet missing. So if you only completed 4 worksheets, you’ll only get a maximum of 40 points out of 60. Along those same lines, you’ll get an additional 5 points for every additional worksheet you complete after your required 6. So these are like bonus points!

Here’s an example of a grade book entry:

<table>
<thead>
<tr>
<th>Name</th>
<th>Axle Points</th>
<th>Trans Points</th>
<th>U-Joints Points</th>
<th>Lab Points</th>
<th>Adjust</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33</td>
<td>47</td>
<td>25</td>
<td>36</td>
<td>34</td>
<td>49</td>
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<td>40</td>
<td>60</td>
<td>5</td>
<td>10</td>
<td></td>
<td>326</td>
<td>93</td>
</tr>
</tbody>
</table>

Written Tests: The written tests will be ASE style questions over topics covered in lecture, lab demonstrations, handouts, and the book. Expect a test approximately every 7 class days.

Performance Tests: The performance test (lab practical) will cover the competencies learned in the lab. The performance test will allow the student to demonstrate the skills obtained. There will be a performance test at the end of the course.

Attendance: Attendance is mandatory. 2.5% of your grade will be dropped for every absence. Every three tardies will equal one absence. It is important that you show up to class on time.

Required Tools: This course requires a complete tool set including all of the tools identified on the required tool list provided. NOTE: to receive a passing grade in this course, you MUST have the required tools!!

Course Outline and Reading List: Students are expected to read the following chapters prior to the discussion in class.

- **Chapter 11:** Drive Axles
- **Chapter 12:** Drive Axle Service
- **Chapter 4:** Clutch Theory

Weeks 1 and 2. Specific test over materials covered in chapters 11 and 12
SAFETY GLASSES ARE MANDATORY. IF FOUND WITHOUT YOUR SAFETY GLASSES YOU WILL RECEIVE ONE WARNING BEFORE BEING ASKED TO LEAVE!

IN CASE OF AN EMERGENCY IN THE LAB:

Dial 911 and provide:
- Nature of emergency
- Victim’s condition
- Location of emergency

Emergency Procedures:

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on the BERT’s website at www.bert.siu.edu, Department of Public Safety’s website www.dps.siu.edu (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.