

COURSE INFORMATION

MAG 21 – EQUIPMENT TECHNICIAN Spring 2010 – Code: 50321

Lecture – Transmissions	T, Th 8:00-9:40	AGR 2
Lab – Transmissions & Air Conditioning	T, Th 10:00-11:50	AGM Shop
Lecture – Air Conditioning	T, Th 1:00-1:50	AGR 2
Lab – Transmission & Air Conditioning	T, Th 2:00-2:50	AGM 5 Shop

Instructors: Gary Wenter

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and

Nick Deftereos

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Office Hours: Both Instructors

Monday - Thursday

3:00 – 4:00 pm

Course Description	8 Units	6 lecture and 6 lab hours per week
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Basic Skills Advisors: Eligibility for ENGL 125, ENGL 126, and MATH 101

Subject Prerequisites/Advisories: None

This course provides in-depth instruction in equipment transmission systems and power equipment air conditioning and heating systems. Equipment transmission systems include clutches, torque converters, hydrostatic applications and manual powershift transmissions. Students will also receive career preparation instruction.

Required Text: Caterpillar 3-ring binder and related materials (by second class meeting).

Course Objectives – In the process of completing this course, students will:

1. Understand the physics related to friction, heat, gear design, and stress distribution.
2. Identify basic components of transmissions, clutches, and torque converters.
3. Develop competency in servicing, diagnosis, and repair of transmission systems.
4. Use diagnostic tooling to test and adjust machine torque converter and transmission systems.
5. Safely use hand and diagnostic tools related to the analysis and repair of power equipment air conditioning systems.
6. Identify the basic components of an air conditioning system used on power equipment.
7. Demonstrate competency in testing and servicing the air conditioning system.
8. Become familiar with the many career opportunities in the equipment industry.
9. Accurately complete job/employment application forms.
10. Effectively write a résumé/personal data sheet.
11. Develop job search skills and procedures, including protocol, verbal communication, and written correspondence.

Course Outcomes - The student who completes this course will be able to:

1. Link principles of physics to machine power train systems.
2. Calculate machine speed given transmission input, RPM, and appropriate gear ratios.
3. Disassemble, make necessary repairs and replacement of parts using correct failure analysis procedures, and reassemble transmissions.
4. Determine wear patterns of gear systems using appropriate service guidelines, and make service and repair recommendations.

5. Troubleshoot electrically controlled hydraulic transmission controls.
6. Link principles of refrigeration theory to power equipment air conditioning systems.
7. Transfer knowledge and skills from lecture/training aids to laboratory activities using machine systems.
8. Select and use problem solving techniques appropriate to air conditioning systems found on power equipment machines.
9. Research and make career choices relevant to interests, salary requirements, and work environment.
10. Anticipate questions that may be asked in the interview process.

Course Outline

The instructor will determine the order in which the following will be presented and developed. It is also probable that several skills may be served by the same assignment.

- A. Introduction to Power Trains
- B. Clutches
 1. Purpose
 2. Dry type assemblies
 3. Oil type assemblies
- C. Torque Converters
 1. Application, theory, components
 2. Operation principles
- D. Introduction to Transmissions
 1. Power flow
 2. Transmission design
 3. Operating principles and functions
- E. Transmission Types
 1. Manual shift
 2. Planetary powershift
 3. Countershaft powershift
 4. Hydrostatic
- F. Basics of Air Conditioning
 1. Basic principles of refrigeration
 2. States of matter
- G. Refrigerants and Oil Refrigerants
 1. Refrigerants – R 12 and R 134 A
 2. Refrigeration oils
- H. Service Equipment
 1. Gauge and manifold set
 2. Refrigerant recovery – recycling station
- I. Inspecting and Diagnosing the System
 1. Visual inspection
 2. Troubleshooting customer complaints
- J. Career Preparation
 1. Orientation to college
 2. Career opportunities
 3. Job applications
 4. Résumé
 5. Job search

Required Materials

Approved eye protection/safety glasses (Z87.1 A.N.S.I.)

Approved footwear

Two work shirts (approximately \$50) – Reedley College Equipment Technician shirt @

Best Uniforms 5091 N. Fresno St. Fresno, CA 93702

Phone: (559) 226-4235

Attendance

Lecture: Attendance is required and roll will be taken at each class meeting. There is no difference between an “excused” or “unexcused” absence. A “tardy” is considered an absence unless the student contacts the instructor at the end of class to change the status from absent to tardy. Two tardies will count as an absence. Any student who misses more than two weeks of class meetings within the first 9 weeks of class may be dropped from the class by the instructor (i.e., class meets two times per week, 4 absences; class meets 1 time per week, 2 absences).

Lab: **Attendance in all labs is mandatory.** Students must make prior arrangements with the instructor to be excused from lab. At that time, the instructor will determine what, if any, make-up work will be appropriate.

Quizzes: There will be **no** make-ups for quizzes.

Tests: Make-up tests are limited to students who have made arrangements with the instructor prior to the required testing period or those students who have been excused by the SCCCD Dean of Admissions, Dr. John Cummings.

Time Clock: All students are required to punch in and out of shop class on a daily basis. Failure to do so will result in an absence. Students are expected to only punch their own cards and cannot, under any circumstances, punch another student’s card. Misuse of the time clock system can result in removal from the class.

Grading Policy/Scales/Evaluation Criteria

For maximum point consideration, all written assignments and term reports should be typed and double-spaced. Lecture assignments (homework) will be accepted late up to the test for that unit of the course; however, late assignments will be penalized 40% of the possible points. Late laboratory assignments turned in within one week of the required due date will be accepted with a penalty equal to 1/3 of the maximum points. Any lab assignment turned in after that time up to the last regular class meeting will be accepted with a 50% penalty.

Point Distribution: 90% = A, 80% = B, 70% = C, 60% = D, 59% & less = D

<u>Assignments & Grades:</u>	Lecture	Homework	100
		Tests – 6 @ 100/each	600
		Quizzes	150
		Final Exam	<u>200</u>
		Lec. Total	1200
	Lab	Participation 60 @ 10/each (Timeliness, clean-up, work ethic)	600
		Assignments	<u>300</u>
		Lab Total	900
		Total =	<u>2100</u>

* Transmissions & Torque Converts will constitute two-thirds and Air Conditioning will constitute one-third of the MAG 21 grade.

Cheating & Plagiarism

In keeping with the philosophy that students are entitled to the best education available, and in compliance with Board Policy 5410, each student is expected to exert an entirely honest effort toward attaining an education. Violations of this policy will result in disqualification for the course.

Accommodations for Students with Disabilities

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact the instructor as soon as possible.

Work Ethic - Most students are enrolled in college classes to obtain a quality job or to enhance their skills for advancement with their current employment situation. Employers look for a punctual, responsible individual who is prepared to go to work. Our goal is to replicate the workplace environment where a student can develop and demonstrate these desirable traits.

- **Punctual:** It is customary to arrive at least 5 minutes before work begins. Individuals will be terminated if they are not punctual.
- **Responsible:** It is expected that an employee work every scheduled work day. Individuals will be terminated if they are not responsible.
- **Prepared:** It is expected that an employee be prepared when he/she arrives for work. Students must have work shirts, safety glasses, and appropriate footwear to participate in the laboratory. If a student is not prepared, he/she cannot participate and will receive a zero (see “responsible”).

Language - English is expected to be spoken in class for the following reasons:

- All course content and materials are presented in English and class discussions all take place in English.
- All lab activities are conducted in groups and must have effective communication between all group members.
- Shop activities can be hazardous and it is vital that instructors receive feedback in English to ensure safe practices.
- This policy is designed so that instructors and all students may communicate in a common language.
- All individuals must have freedom of expression and are allowed and encouraged to communicate in the language of their choice outside of class times, including breaks.

Behavioral Standards

- Each student is responsible for his/her own work. Written assignments are not group assignments and no credit will be awarded for students who turn in the same work. Students suspected of cheating on tests and quizzes will receive no credit for that particular assignment and may be removed from the class.
- It is considered polite to turn off cell phones when in the classroom or shop. Please do so.
- Texting is not allowed in class.
- Sleeping is not allowed in class.
- There is no smoking allowed in classrooms, shops, or school vehicles. Please smoke only in designated areas and away from all machines and equipment.
- This class is set for the semester. All doctor’s appointments, interviews, meetings with counselor, and other types of appointments should be scheduled during your time outside of class.

Important Dates

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| • Last day to drop and qualify for a refund | <u>January 22</u> |
| • Martin Luther King Holiday | <u>January 18</u> |
| • Presidents’ Day Holiday | <u>February 12-15</u> |
| • Last day to drop a class and not receive a letter grade | <u>March 12</u> |
| • Spring Break | <u>March 29- April 2</u> |
| • Finals Week | <u>May 17-21</u> |

<p>FINAL EXAM: Transmissions & Torque Converters – Tuesday, May 18, 8:00 a.m. Air Conditioning – Tuesday, May 18, 1:00 p.m.</p>
