

COURSE INFORMATION

MAG 20 – EQUIPMENT TECHNICIAN**Spring 2010 – Code: 50319****Diesel Engines, Service Fundamentals & Machine Systems**

Lab – Diesel Engines	M,W	8:00-8:50	AGM Shop
Lecture – Engines	M,W	9:10-11:50	AGR 2
Lab – Diesel Engines	M, W	1:00-1:50	AGM Shop
Lecture – Service Fundamentals	M,W	2:00-2:50	AGR 2
Lecture – Machine Specific Systems	F	8:00-9:40	AGR 2
Lab – Machine Specific Systems	F	10:00-11:50	AGM Shop

Instructors: Larry Dinis

Office: AGM 5

Office #: 638-3641, Ext. 3151

E-mail: larry.dinis@reedleycollege.edu**Office Hours:**Monday – Thursday

3:00-4:00

Friday

10:00-11:00

Nick Deftereos

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3:00-4:00

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Office: AGM 5

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E-mail:

Course Description

11 Units

8 lecture and 9 lab hours per week

Basic Skills Advisors: Eligibility for ENGL 125, ENGL 126, and MATH 101

Subject Prerequisites/Advisories: None

This course provides in-depth instruction in diesel engines, service department skills and expectations, and specific instruction on agricultural and construction machines. The design and construction of diesel engines, principles and theories of operation, and disassembly and reassembly of engine components will be covered. Instruction on technical reference materials, parts and service books, computer systems and programs used by the service technician will be covered. Students will also receive training on the service and operation of various machine and engine systems common to the equipment industry.

Required Text:

- A. Caterpillar 3-ring binder and related materials (Includes CAT Key)
- B. Book – Diesel Engines and Fuel Systems Repair

(By second class meeting).**Course Objectives –** In the process of completing this course, students will:

1. Correctly communicate diesel engine operation theory of compression, injection, and internal combustion.
2. Accurately measure serviceable engine components and compare data to manufacturer's specifications.
3. Successfully select and order replacement parts using computer applications, manufacturer's diesel engine parts books, and machine specific service manuals.
4. Demonstrate proficiency in disassembling, re-assembling, and operating Caterpillar diesel engines.
5. Diagnose and troubleshoot diesel engine problems or failures.

6. Develop knowledge in machine system nomenclature.
7. Demonstrate proficiency in safe machine operation.
8. Develop competency in completing pre-delivery inspection forms.
9. Properly use preventative maintenance technical preferences.
10. Communicate the benefits and features of various machines.
11. Analyze electronic fault codes generated by machine on board computers (EM).
12. Identify and comprehend customer service department policies and procedures.
13. Demonstrate proficiency in estimating repair hours required.
14. Accurately explain repair warranty work.

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

1. Identify machine system components on common construction/agriculture equipment.
2. Interpret machine preventative maintenance schedules.
3. Perform a machine pre-check and safely operate equipment.
4. Use problem-solving techniques to accurately diagnose machine generated fault codes.
5. Measure critical wear components such as crankshaft, camshaft, and linkage.
6. Properly pin time a 3406 B fuel pump.
7. Demonstrate correct torquing procedure.
8. Disassemble and re-assemble a 3406 B engine.
9. Successfully operate Service Technician Workbench on a PC.
10. Correctly use micrometers, dial indicators, and dial bore gauges.
11. Identify role of service technician in a machinery service department.

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 Diesel Engines
 1. Safety
 2. Tools and equipment
 3. Engine oil and diesel fuel
 4. Cycle operation/combustion chamber
 5. Basic engine compression
 6. Engine disassembly
- B. Diesel Engine Components and Service
 1. Cylinder block
 2. Camshaft
 3. Crankshaft
 4. Piston and rings
 5. Cylinder head and valves
- C. Diesel Engine Systems
 1. Air intake systems
 2. Exhaust systems
 3. Cooling systems
 4. Lubricating systems
- D. Fuel Injection Systems
 1. Governors
 2. Emission control
 3. Fuel injection nozzles and holders
 4. Lubricating
- E. Electrical Systems
 1. Electricity and magnetism
 2. Electrical systems
 3. Batteries
 4. Starting systems

5. Charging systems
- F. Troubleshooting Diesel Engines
 1. Proper starting procedure
 2. Diagnosis
 3. Tune-up
- G. Introduction to Machine Specific Instruction
 1. Role of equipment technician
 2. Technical reference material
 3. Machine/shop safety

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, 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 SCCC Dean of Admissions, Dr. John Cummings.

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 1/3 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 64 @ 10/each (Timeliness, clean-up, work ethic)	640
		Assignments	<u>560</u>
		Lab Total	1200
		Total =	<u>2400*</u>

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.
- Turn **off** cell phones when in the classroom or shop. **Texting** is not allowed in class.
- There is **no smoking** allowed in classrooms, shops, or school vehicles. Any smoking needs to take place in designated areas away from equipment and flammable liquids.
- 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

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

FINAL EXAM: Engines – Monday, May 17, at 10:00 a.m.

Service Fundamentals – Monday, May 17, @ 2:00 p.m.

Machine Specific Systems - Wednesday, May 18, @ 1:00 p.m