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| **COURSE INFORMATION** |

**MAG 20 – EQUIPMENT TECHNICIAN**

**Fall 2012 – Code: 52440**

**Diesel Engines, Service Fundamentals & Machine Systems**

**Lab – Diesel Engines M, W 8:00-9:50 AGM Shop**

**Lecture – Engines M, W 10:20-11:50 AGR 15**

**Lab – Diesel Engines M, W 1:00-1:50 AGM Shop**

**Lecture – Service Fundamentals M, W 2:00-2:50 AGR 15**

**Lecture – Machine Specific Systems F 8:00-9:40 AGR 15**

**Lab – Machine Specific Systems F 10:00-12:50 AGM Shop**

**Instructors: Larry Dinis** **Office Hours:** Mon., Tues., Wed.

Office: AGM 5 3:00-4:00

Office #: 638-3641, Ext. 3151

E-mail: larry.dinis@reedleycollege.edu

**Nick Deftereos Office Hours:** Tuesday – Thursday

Office: AGM 5 10:00-11:00

Office #: 638-3641, Ext. 3736 Wednesdays

E-mail: nick.deftereos@reedleycollege.edu 3:00-4:00

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Office: AGM 5

Phone #: 859-8020

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:**

1. Caterpillar 3-ring binder and related materials (Includes CAT Key)
2. 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 $60)

TKO Apparel

1776 11th St.

Reedley, CA.

859-6074

**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 SCCCD Dean of Admissions, David Clark.

**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 = F

Assignments & Grades: **Engines** Assignments 10%

 Tests and Quizzes 10%

 Lab Assignments 10%

 Lab Participation 10%

 **Service** Assignments 10%

 Tests and Quizzes 10%

 Lab Assignments 10%

 Lab Participation 10%

 **Machine** Assignments 5%

 Tests and Quizzes 5%

 Lab Assignments 5%

 Lab Participation 5%

**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 than 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 with 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 August 31
* Labor Day September 3
* Last Day to drop a class and not receive a letter grade October 12
* Veterans Day                      November 12
* Thanksgiving Holidays November 22-23
* Finals Week December 10-14

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| **FINAL EXAM: Engines & Service Fundamentals – Monday, Dec. 10, at 8:00 a.m.** **Machine Specific Systems - Wednesday, May 12, @ 1:00 p.m**  **Final Exam is mandatory. Failure to participate will result in a non-passing grade** |