

***Spring 2021***

**MAG 42 56354**

**Gas/Diesel Engines**

**Syllabus**

**Instructor:** Cory Withers

**Office Hours:** Monday - Thursday 3:00 - 4:00pm AGM 5 or by arrangement.

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**Coordinator, Student Health Services:**

Kelly Murguia

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**Lecture Meeting:** Monday & Wednesday, 4:00 - 4:50pm LSH 1

**Lab Meeting:** Monday & Wednesday, 5:00 - 6:15pm, MAG Shop

**Units:** 3

**Course Description:** This course provides experiences in the safety, theory of operation, maintenance, precision measurement and repair of small gasoline internal combustion engines. Diesel power engines will be introduced during the course.

**Course Goals:**

* The student will develop an understanding of basic small gas engines and compact diesel engines
* The students will be able to properly troubleshoot and repair small gas engines

**Student Learning Outcomes:**

*Upon completion of this course student will be able to***:**

* ***Demonstrate the ability to completely rebuild small gas engines as they relate to the compact equipment industry.***
* ***Demonstrate the ability to correctly troubleshoot and repair small engine systems.***

**Course Objectives**

*In the process of completing this course, students will be able to:*

1. Demonstrate proper safety procedures related to the small gas and diesel shop.
2. Demonstrate proper use of tools.
3. Properly Utilize service manuals.
4. Explain the four-stroke operation and two-stroke operation.
5. Describe the essential systems of a compact engine.
6. Perform an engine teardown and rebuild.
7. Display safe, clean and proper work habits.
8. Analyze engine components wear using precision measurement.
9. Demonstrate proper torqueing techniques.
10. Troubleshoot common engine starting problems.
11. Demonstrate proper engine starting procedures.
12. Correctly identify and use fluids used in small compact equipment.

**Lab Dress:** Work clothes, shop coats, or coveralls. No loose clothing. Long hair must be restrained. Closed toe shoes are required. Safety glasses will be worn at all times.

**Required Lab Equipment:**

* OSHA approved Z87.1 or higher safety glasses
* Closed-toed shoes/boots

**Safety:** Safety is a primary concern while working in the shop. Students that are not working in a safe manner will be required to leave the shop. This includes failure to wear adequate eye protection. You will receive instruction on the safe operation of the equipment; any unsafe operation will be dealt with accordingly. **Proof of tetanus immunization is required.**

**Required Text:**

Alfred Roth, Small Gas Engines, 11th edition The Goodheart-Wilcox Company Inc. Publisher.

**ISBN: 9781635638516** (This is the online version that can be purchased from the bookstore)

Students are expected to have read the assigned reading before lecture.

**Students Responsibility:**

* Students are strongly advised not to miss labs since this time may be difficult or impossible to make them up.
* No makeup’s will be allowed unless by prior permission of the instructor.
* Cleanup of the shop is part of the laboratory exercise. Students not participating in shop cleanup will have points deducted from their project grades.
* No written assignments will be accepted after the last lecture meeting. Late assignments are subject to a 20% penalty. No lab projects will be accepted after the final exam.
* Instructional handouts will be given in almost every class or laboratory.

**Lecture Content:**

**Small Gasoline and Diesel Engines**

1. Introduction to Small Gas Engines
2. Shop orientation and safety
3. Tools and Equipment
4. Power Portal Introduction
5. Basics of Engines
6. 4-Stroke Operation
7. Engine Compression System
8. Repair Manuals
9. Engine Performance
10. Engine Components and Service
11. Cylinder Block
12. Camshaft
13. Crankshaft
14. Pistons, Rings, and Rods
15. Cylinder head and valves
16. Engine Systems
17. Air intake system
18. Exhaust System
19. Cooling System
20. Lubrication system
21. Engine Inspection
22. Precision measurement
23. Specifications
24. Engine analysis
25. Fuels systems
26. Gasoline fuel systems
27. Diesel fuel systems
28. Governing systems
29. Emissions systems
30. Electrical theory
31. Electrical systems
32. Magnetism
33. Starting systems
34. Charging systems
35. Batteries
36. Troubleshooting
37. Diesel engine troubleshooting

**Lab Content:**

**Small Gasoline and Diesel Engines**

**LABS**

1. Shop tour/Parts Identification

2. Engine Identification/Repair Manuals

3. Pre-start Checks/Starting Procedures

4. Engine Disassembly

5. Engine Measurement/Measurement Analysis

6. Components Repair and Cleaning

7. Parts Ordering/Illustrated Parts Lists

8. Torque Procedures and Specifications

9. Engine Reassembly

10. Carburetor

11. Engine Fluids (Oils and Fuels)

12. Ignition Systems

13. Valve Adjustments

14. Starting procedures

15. Troubleshooting Ignition System

16. Troubleshooting Fuel system

17. Troubleshooting Compression System

18. Diesel Engine Components Identification

19. Diesel Engine Starting Systems and Procedures

20. Diesel Engine Valve Adjustments

**Subject to Change:**

This syllabus and schedule are subject to change. If you are absent from class, it is your responsibility to check on any changes made while you were absent.

**Evaluation:**

Students will be evaluated on the basis of their performance on quizzes (announced and unannounced), written assignments, unit tests, lab projects and final examination according to the following scale.

Unit Assignments & Quizzes 40%

Lab Assignments/Projects 40%

Tests 10%

Midterm/Final 10%

Your grade in this course will be based on the following scale:

A – 90 – 100%

B – 80 – 89%

C – 70 – 79%

D – 60 – 69%

F – 59% and below

**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 one absence. Any student who misses four class sessions within the first nine weeks of class may be dropped from the class by the instructor. Greater than four absences for the entire semester will result in a failing grade. Your attendance rate must be greater than 85% for the semester.

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 acting manager of Admissions, Veronica Jury.

**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 will be worth a maximum of 60% of the total points possible.

**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 the 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 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”).
* Professional Appearance: Long pants and work boots are required daily. **Failure to adhere to this policy will result in dismissal for the day.**

**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.
* This policy is designed so that instructors and all students may communicate in a common language. Safety and the technical nature of this course requires clear communication.
* Appropriate language is expected at all times. Many people find cussing and vulgar language offensive so please be aware of your language when on campus or whenever representing the college.

**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, quizzes or assignments will receive no credit for that particular assignment and may be removed from the class or receive a failing grade**.
* Turn off cell phones when in the classroom or shop.
* Texting in class is **unacceptabl**e. Cell phones are strictly prohibited in class and should not be seen. Unnecessary use of electronic devices will result in dismissal of the class for the day.
* Reedley College is a **Tobacco Free Campus**! No tobacco products of **any** form are allowed while on campus. This includes “E-Cigarettes”
* Sleeping is **not** allowed in class. If you cannot stay awake you should go home and get some sleep, or try going to bed at an earlier hour.
* This class is set for the semester. All doctor’s appointments, interviews, meetings with counselors, and other types of appointments should be scheduled during your time outside of class.

**Important Dates**

* Martin Luther King Holiday January 18
* Last day to drop for a full refund January 22
* Famous Deceased Presidents Days February 12 & 15
* Last day to drop without a letter grade March 12
* Spring Break March 29 - April 2
* Last day to turn in assignments May 14
* Finals Week May 17-21

**FINAL EXAM: – Monday, May 17, at 1pm**

On-Campus:

As we return Spring 2021, there are procedures to help keep students, faculty, staff, and their families safe and compliant with state regulations.

**COVID 19 Safety Practices**

**Masks**: Students, faculty, and staff are required to wear masks that cover the nose and mouth when entering, exiting, while inside buildings and when unable to social distance. Students who have medical need can use face shields as an alternative.

**Handwashing**: Students are required to wash their hands or use hand sanitizer prior entering classroom or other campus buildings.

**Social Distancing**: Maintain a distance at least 6 feet apart from others while on campus.

**Cleaning**: Disinfect areas that students and the public touch frequently. Each service area should develop specific guidelines on frequency based on the nature of student contact.

**Ingress and Egress**: Shared spaces have, when possible, designated an entrance and an exit door to minimize congestion.

**Reminders**: If in an area where students congregate, it might be appropriate to remind students that they should not be on campus if they are experiencing symptoms, that they need to hand sanitize if they have not recently washed their hands, that they should be wearing their masks, and that they need to be 6 feet apart. Signage will be posted, but verbal reminders are appropriate as well, particularly for areas where students form lines.

**Equipment**

**Computers**: Most open computer labs are temporarily closed. Students are encouraged to bring their own computers from home, if possible. If they do not have a home computer, have them contact IT which will issue them a computer to use for the semester. These computers will be used in all locations, including computer labs.

**Lab Computers**: Shut down all office and service area computers after every use. The fog used to disinfect rooms will corrode the computer if the fan is left running.

**HVAC**: Appropriate ventilation is an important preventative measure; however, do not assume that your classroom door or windows should be open. HVAC systems are being adjusted for appropriate airflow. If your area is on Central Plant or Package HVAC systems, opening the doors and windows decreases ventilation. If your building utilizes evaporative cooling or has no cooling system, doors and windows can be opened if appropriate for your classroom setting. For more information contact Building Services.

**Policy and Process**

All employees must complete the health screening every day they come to campus (on the portal page). If you are not feeling well, have been exposed to an individual who has tested positive for COVID-19, or you have tested positive for COVID-19, stay home and contact your supervisor immediately and contact Human Resources for information on leave options. Close contact is defined as “someone who has spent 15 minutes or more time within 6 (six) feet or less of individual who has been exposed or is positive for COVID-19 while unmasked. COVID-19 symptoms are fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, new loss of taste or smell, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea.

* High risk individuals: For students and staff considered to be a member of a vulnerable population as a result of underlying medical conditions, age or other co-morbidities, or for those that need religious accommodation, are pregnant or nursing, or live with a person with compromised immunity, the College will work with internal partners, including Human Resources, student services offices, counseling, instruction and operations to provide additional, non-discriminatory protocols to reduce risk of infection. This will include a process for making requests for reasonable accommodations by an at-risk person through normal institutional processes. Human Resources and have developed a process through which faculty, staff, and students are informed about how to access the accommodations process on the College’s website.
* Symptomatic Students: If students are displaying symptoms of COVID, you are encouraged to remind them that they are not to come to campus with symptoms. Encourage them to go home and contact their healthcare provider or the Reedley College Health Services.
* Common COVID-19 Symptoms include, but are not limited to:
* Respiratory symptoms: cough, sore throat, shortness of breath
* Fever of 100.4 degrees F or higher or chills
* Review [CDC’s COVID-19 symptom](https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) for a full list.

COVID 19 Positive Student: If you have a student who tells you he or she is symptomatic or positive for COVID 19, tell the student to stay home and notify your supervisor and Nurse Kelly Murguia.

1. You may be required to quarantine for 14 days based on the Fresno County Department of Public Heath guidelines.
2. Consider visiting an available testing site in the area.

**Enforcement of Policies**

We have all seen that there can be push back on COVID mask policies. We ask that you remind students that our policies are following legal mandates from our governor and CDC Guidance for educational areas. If students do not follow policies, we encourage you to use the following as a baseline for your response:

1. Remind students that the policy is a campus-wide policy.
2. Have an individual conversation/dialogue with the student about why they are not complying. Try to resolve the situation yourself.
   1. If they do not have a mask, refer them to the free mask sites.
   2. If the student has a medical concern about using a mask, refer the student to Health Services.
   3. Document your interaction using a COVID Compliance Flag in Starfish. This flag will not automatically be sent to the student; however, COVID health services information will be forwarded to the student.
   4. If the situation is resolved between you and the student, document it with the flag, but close the flag when resolved.
3. If the student still does not comply, remove the student from the class for the day. Immediately contact the Dean of Students, Shannon Solis to document the encounter.

We discourage you from calling the police unless the situation escalates to an emergency. Work with the Dean of Students and allow the Behavior Intervention Team to deal with the student and to coordinate with police as necessary.

These practices were developed by the Reedley College COVID-19 Taskforce, with broad representation from faculty and staff from multiple areas of campus.  We all know that these are unprecedented times; this guidance is subject to change as the situation evolves.