

***Spring 2023***

**MAG 42 56354**

**Gas/Diesel Engines**

**Syllabus**

**Instructor:** Arthur Faria

**Office Hours:** Monday - Thursday 10:00 - 11:00 AM AGM 5 or by arrangement.

E-mail: arthur.faria@reedleycollege.edu

Phone: (559)-494-3000 Ext. 3138

**Coordinator, Student Health Services:**

Kelly Murguia

E-mail: Kelly.murguia@reedleycollege.edu

Phone: (559)-494-3750

**Lecture Meeting:** Monday 4:00 PM - 5:50 PM. LSH 1

**Lab Meeting:** Monday 6:00 PM - 9:00 PM, 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
* Charged Laptop or Tablet

**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 and Tool Identification
2. Fastener ID and Measurement
3. Helicoil Thread Repair
4. Model-Type-Code, Parts Ordering/Illustrated Parts Lists
5. Pre-Start Checks/Starting Procedures/Engine Adjustments
6. Engine Disassembly
7. Engine Measurement/Measurement Analysis
8. Torque Procedures and Specifications
9. Carburetion
10. Engine Reassembly
11. Valve Adjustments
12. Engine Fluids (Oils and Fuels)
13. Battery and Charging Systems
14. Systematic Troubleshooting
15. Diesel Engine Components Identification
16. Diesel Engine Starting Systems and Procedures
17. 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

Certifications: We will be utilizing the Briggs & Stratton Power Portal site for technical information as well as industry recognized certifications that can be earned through the site. Earned certifications will be used towards grades.

**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 16th
* Last day to drop for a full refund January 20th
* Washington Birthday Observed February 20th
* Last day to drop without a letter grade March 11th
* Spring Break April 3rd - April 7th
* Last day to turn in assignments May 14
* Finals Week May 15th-19th

**FINAL EXAM: – Wednesday, May 17th, at 4 PM-5:50 PM**