SMALL ENGINES (0140) FALL

2016-2017

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Course Description

This course is designed to familiarize the student with the basic theory and specialized skills in selection, operation, maintenance, and overhaul of small air-cooled engines. Students will be required to memorize all parts of the engine, the function, and special tools to remove those parts. This class is a lecture based class which will include bookwork on theory of the 3 basic engine systems. Students will learn to look up parts and order them correctly. There will be an opportunity to work on limited projects.

Course Objectives

A. Safety
1. Identify safety equipment necessary for agricultural power technology
2. Apply basic laboratory safety instruction
3. Describe safety practices when using electrical equipment
4. Apply safety practices when using tools and equipment

B. Tool and Parts Identification
1. Determine what information is needed for parts and mechanics manual usage
2. Identify the basic engine parts and the functions of each in the operation of an engine
3. Use the manufacturer's respective master parts manual in ordering replacement parts for an engine
4. Use a manufacturer's manuals to solve the procedural problems specific to a particular engine 5. Identify the parts of a magneto ignition system 6. Identify the major components of a carburetor 7. Identify the types of carburetors and describe the features of each of these types of carburetors 8. Identify the basic types of governors
9. Identify the parts of a valve and its accessories
10. Identify the parts of the piston, rings and rod
11. Identify the types of lubricating systems and describe how they operate
12. Identify the parts of the camshaft and tappet mechanism
13. Identify the types of crankshafts and parts thereof
14. Identify the major types and applications of tools

C. Operating Principles
1. Designate an engine as a two or four cycle
2. Identify engine by brand name and/or manufacturer
3. Determine what information is given on the nameplate
4. Identify operating conditions of small gasoline engines

5. Use horsepower terms such as indicated, friction, brake and "rated" in describing the size of an engine
6. Define and relate the following terms: a. stroke b. bore c. cycle d. crankshaft revolution e. camshaft revolution f. principle events g. intake h. compression i. power j. exhaust k. camshaft timing l. ignition timing m. BTDC n. TDC o. BDC p. power strokes per revolution of camshaft q. displacement r. compression ration s. clearance volume
7. List the sequential order and explain the significance of the principle events in the operation of a four-stroke cycle engine
8. Explain the relationship of the main parts of the four-stroke cycle engine to the principle events 9. Identify a four-stroke cycle engine by visual observation
10. Explain the difference in operation and construction of the two and four-stroke cycle engine
11. Recognize a two-stroke cycle engine by visual observation
12. Describe the combustion as the focal point of engine operation
13. Describe the basic operating principles of a magneto ignition system
14. Describe the operational principles of a carburetor
15. Diagram the basic principle of carburetor to governor to throttle control linkage
16. Describe the operation of each type of governor
17. Describe the purpose and operation of valves

D. Overhaul Procedures
1. Disassemble a small engine according to the procedures outlined by the manufacturer
2. Identify the wear points on a disassembled engine
3. Assemble a small engine according to the procedures outlined by the manufacturer
4. Describe the tolerance, specifications, clearance and reject size given by the manufacturer and how these terms affect engine operation
5. Identify those parts of an engine that need to be measured with a measuring device
6. Use micrometer measurements to determine if parts of a small engine are within the specifications set by the manufacturer
7. Manipulate the different micrometers and measuring devices so as to record proper measurements
8. Identify engines and machines according to model, serial, specification and type numbers when each applies
9. Use the manufacturer's specifications and torque data
10. Reface valves
11. Reface valve seats
12. Adjust valve tappet clearance
13. Install the piston rings
14. Install the piston rod assembly
15. Install the camshaft and tappets

E. Troubleshooting and Tune up Procedures
1. Clean and inspect the exhaust system of a two-cycle engine
2. Identify and service the different types of air cleaners
3. Identify and service the different types of breathers
4. Prepare a fuel and oil mixture for a two-stroke cycle engine
5. Identify and service the different types of spark plugs
6. Start an engine and adjust it for speed and load
7. Check and service the magneto and its parts for proper operation

8. Time the point opening to the piston position
9. Check each of the different types of carburetors for proper operation
10. Check and adjust the governors for proper operation
11. Find and use manufacturer's recommendations for troubleshooting problems in a small engine

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Course Units

Quarter 1	Quarter 2	Quarter 3	Quarter 4
A. Safety B. Tool and Parts Identification	B. Tool and Parts Identification	C. Operating Principles D. Overhaul Procedures	D. Overhaul Procedures E. Troubleshooting and Tune up Procedures

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Materials

Paper and pencil or pen

Skyward Grading

Score Method	Term Grades (MHS Policy)	Grading Scale (MHS Policy)
Total Points *or* Weighted Grades <<replace with weighted percentages>>	**Fall** Quarter 1=40% Quarter 2=40% End of Course Assessment=20% **Spring** Quarter 3=40% Quarter 4=40% End of Course Assessment=20%	A=90%-100% B=80%-89% C=70%-79% D=60%-69% F=Below 60%

Make-Up Work (MHS Policy)

Papers, assignments, tests, etc. that were announced while the student was in attendance prior to the absence are due to be submitted or completed on the day the student returns to school. A student will be allowed two (2) school days for each day of excused absence to make up material presented during the absence. Make-up time is not to exceed ten (10) days from the time a student returns to school after an absence. Additional time may be granted at the principal's discretion under extenuating circumstances. When a student has been absent for three (3) or more consecutive school days due to illness or excused absence the parent or student may call the Attendance Office to request make-up homework be sent to the office for pick-up. Please allow 24 hours for teachers to respond before coming to the office to pick up

work. **In the case of pre-arranged absences, it is the responsibility of the student to contact individual teachers for any make-up work prior to the absence.**

Late Work

<<No late work accepted>>

Classroom Rules and Procedures

Class Rules

1. ***Come to class on time.*** Standing outside the door and rushing in after the bell has begun to ring will constitute a tardy. You must be INSIDE the door when it begins ringing to be counted on time. Students will be given detention after three tardies.

2. ***Attend to personal needs before coming to class.*** I have been instructed not to give passes to lockers and to limit passes, so please do not ask for a pass unless you have a true emergency.

3. ***Remain in your seat unless you have permission to get up*** . Clean up after yourself before you leave class

4. ***Do not eat candy or other food including drinks in class unless you have been given special permission.***

5. ***Bring required materials every day unless you are otherwise directed.***

6. ***Talk only when permitted.*** Be aware of the situation since quiet talking is allowed in some situations and speaking to the entire group without raising your hand may be allowed in others. I will remind you once and expect compliance.

7. ***Respect the schools property and others.*** Deliberately damaging school property or disrespecting others will not be tolerated.

8. ***Do not cheat.*** Students caught cheating will receive a zero and a phone call home. Both the student who shares his work for an independent assignment AND the person who copies it will suffer the same consequences. I expect you to do your own work and to be sure no one can copy it.

Discipline

Refer to the student handbook and you may also be required to sweep the shop.

Academic Integrity (MHS Policy)

All work submitted by a student must represent his/her own ideas, concepts, and current understanding. All material found during research must be correctly documented/cited to avoid plagiarism. Any student caught cheating or plagiarizing on course assignments or exams will lose credit for that assignment or exam. The teacher will notify parents. Students may be subject to disciplinary action, including a parent conference.

Student & Parent Resources

School Website: http://mhs.msd134.org/

<<Replace this text with student/parent resources (e.g. Google Classroom, teacher website, etc.)>>

Other Information

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