**COURSE SYLLABUS**

**SMER 1437**

**FOUR STROKE ENGINE and TRANSMISSION**

**COURSE DESCRIPTION:**

Overhaul procedures for four stroke small engines, transmissions, and transaxles. Emphasis on shop procedures for disassembly, assembly, component inspection, component measurement, component servicing, transmission troubleshooting, transmission inspection, and transaxle inspection.

**PREREQUISITES:** None

**Instructional Methodology:**

Using a combination of computer, video, and lecture, plus faculty demonstration, student will practice towards mastery of all listed tasks.

**TEXTS AND REFERENCES USED:**

1. **SMALL GAS ENGINES** (Alfred C Roth) (ISBN 978-1-60525-547-7) 10th Edition
2. Chapters 1-3,5,6,15-19
3. Manufacturer's service manuals.
4. Selected films and charts from various sources.
5. Books can be found in the RVS bookstore located downstairs in Bldg. G

**CLASS AND LAB REQUIREMENTS:**

1. Regular attendance is required. Only limited absences and tardiness will be accepted if a grade better than a "D" is expected. \*(1C-1, 4, 2A-4)
2. Students are required to maintain a "C" **average,** or a grade point average of 2.00**.** This means thatthe **average** of **all** classes must be a "C" in order to obtain either a certificate of completion, or degree. Students who either arrive late for class, leave early, and/or bring no tools cannot expect to complete lab assignments in a timely manner and receive a grade better than "D". For further information see the sections on "graduation" and "Academic Suspension" in the administration Information area of the current ACC Catalog. \*(1A-1, 1C-1, 2, 4, 5, 2A-4)
3. Each student will have his/her own tools available for shop work at the beginning of each class period. Loaning or borrowing of tools between students is discouraged. Specialty tools, tools not on the student tool list, are available from the Tool Room.

**GRADING:**

1. Lab activities will constitute 70% and tests will make up 30% of total grade.
2. Homework assignments and pop quizzes will be given. A student will not be given a passing grade, "D", without 100 per cent participation in pop quizzes and completion of homework assignments. \*(1A-4, 1C-1, 2A-4)
3. A passing grade, "D", will not be awarded to any student who has not achieved an average letter grade of "C" or higher on exams.
4. A positive constructive attitude also plays an important part in the overall evaluation of the shop work and will be directly related to the shop grade. \*(1C-1, 2, 4, 5, 2A-4)
5. Any withdrawals are the responsibility of the student. If the student fails to make the withdrawal by the drop date, an automatic grade of "F" will be awarded. \*(1C-1, 4, 2A-4)

**PROJECTS FOR SHOP WORK:**

Although projects are always needed for shop, whose project and which project is worked on first is not considered an important part of the course. All projects being worked on in the shop must first be approved by the instructor. Even though emergencies occur with equipment breaking down, we are not here to schedule work as a garage would. Time schedules will not be considered or given as related to repair work of any given project. Only work related to the course will be considered. No work will be performed on any equipment if the subject has not first been covered in the classroom.

**CARE AND CLEANING OF TOOLS, EQUIPMENT AND SHOP AREA (including class room)**

All students will be expected to participate in shop and classroom cleanup at the end of each class period. Ample time will be allotted by the instructor for this purpose. All tools will be cleaned and put in the proper place before class will be dismissed. \*(1A-4, 2B-1, and 2A-2)

**SCANS SKILLS:**

Listed below and identified \* with activities throughout this syllabus are the generalized Scans Skills. A complete explanation of these headings is found in the GUIDELINES FOR INSTRUCTIONAL PROGRAMS IN WORKFORCE EDUCATION by the Texas Coordinating Board.

1. **FOUNDATION SKILLS**
2. BASIC SKILLS:
3. Reading
4. Writing
5. Arithmetic and Mathematical Operations
6. Listening
7. Speaking
8. THINKING SKILLS:
9. Creative Thinking
10. Decision Making
11. Problem Solving
12. Visualize
13. Reasoning
14. PERSONAL QUALITIES:
15. Responsibility
16. Self-Esteem
17. Sociability
18. Self-Management
19. Integrity and Honesty
20. **WORKPLACE COMPETENCIES**
21. RESOURCES:
22. Time
23. Money
24. Material and Facilities
25. Human resources
26. INTERPERSONAL SKILLS:
27. Participate and Member of a Team
28. Teach Others New Skills
29. Serve Clients/Customers
30. Exercise Leadership
31. Negotiate
32. Work with Diversity
33. INFORMATION:
34. Acquire and Evaluate Information
35. Organize and Maintain Information
36. Interpret and Communicate Information
37. Use Computers to Process Information
38. SYSTEMS:
39. Understand Systems
40. Monitor and Correct Performance
41. Improve or Design Systems
42. TECHNOLOGY:
43. Select Technology
44. Apply Technologies to Task
45. Maintain and Troubleshoot Equipment

**SCANS SKILLS AND OTHER NOTATIONS**

Notated and identified \* with activities throughout this syllabus are the generalized Scans Skills. A complete explanation of these headings is found in the GUIDELINES FOR INSTRUCTIONAL PROGRAMS IN WORKFORCE EDUCATION by the Texas Coordinating Board.

1. **Orientation/Work Safety**
	1. Hand tool safety
	2. Power tool safety
	3. Fire extinguishers
	4. Proper housekeeping
	5. Hazardous materials
2. **Tool Identification & Operation**
	1. Sockets
	2. Wrenches
	3. Pliers
	4. Screw drivers
	5. Hammers
	6. Punches
	7. Pullers
	8. Ring compressors
	9. Valve spring compressors
	10. Piston ring compressors
3. **Fasteners, Sealants and Gasket Identification & Use**
	1. Bolts & Nut Terminology
	2. Cotter, Clevis, Rolled, Taper & other types of pins
	3. Adhesives, sealers & gasket makers
4. **Precision measuring instruments. Identification & use**
	1. Micrometers
	2. Depth gauge
	3. Digital and dial calipers
	4. Telescoping gauges
	5. Small hole gauges
	6. Bore gauge
	7. Torque wrenches
5. **Engine & OEM Equipment Identification**
	1. Manufacture brand
	2. Model numbers
	3. Serial number
	4. Type number
6. **Customer Service**
	1. Diagnosing equipment problems with customer
	2. Work orders
7. **Discuss four stroke engine principles of operation**
	1. Discuss the four strokes of operation
		1. Intake
		2. Compression
		3. Power
		4. Exhaust
	2. Discuss valve timing
	3. Discuss types of lubrication
		1. Splash system
		2. Pressure system
	4. Discuss cooling systems
		1. Air cool
		2. Liquid cool
	5. Discuss governor systems
		1. Air governor
		2. Mechanical governor
	6. Explain the compression relief system
	7. Discuss valve & camshaft operations
		1. L Head/Flathead system
		2. Overhead valve system
		3. Overhead cam system
	8. Discuss the following
		1. Pistons
		2. Piston rings
		3. Crankshafts
		4. Camshafts
		5. Valves
		6. Connecting rods
		7. Seals & gaskets
8. **Small engine four stroke overhaul**
	1. Research service data
	2. Engine removal
	3. Engine disassembly
	4. Identify & inspect all parts
	5. Precision measuring of wear limits
	6. Machining cylinder & valves
	7. Look up & order parts
	8. Engine assembly
	9. Engine break-in