Date Approved: _____
Date Revised: _____

Angelina College
Technology and Workforce Division
DEMR 1406 Diesel Engine I
Instructional Syllabus

I. BASIC COURSE INFORMATION:

A. Course Description: *(as stated in the bulletin, including necessary pre-requisite courses, credit hours)*
DEMR 1406 - Four hours credit. An introduction to the basic principles of diesel engines and systems. The student will describe the history of diesel engines and diesel systems and their evolution; demonstrate knowledge of the basic principles of diesel systems and engines and how they function; and utilize precision instruments to diagnose and repair basic systems and engines. Prerequisites: Work Keys test section for Applied Math and Reading for Information. Two lecture and six lab hours each week. Lab fee.

B. Intended Audience: First semester students studying Diesel Technology and preparing for employment as a diesel technician in the diesel industry.

C. Instructor:
Name: Gary W. White
Office Location: ITC 102
Office Hours: As posted each semester
Phone: (936) 633-5253
E-mail Address: gwhite@angelina.edu

II. INTENDED STUDENT OUTCOMES:

A. Core Objectives Required for this Course

1. Critical Thinking Skills to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. Communication Skills to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. Empirical and Quantitative Skills to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

B. Exemplary Objectives – (Found in the Texas Higher Education Coordinating Board Document. Titled: CORE CURRICULUM: ASSUMPTIONS AND DEFINING CHARACTERISTICS Dated: April 1998)
NA

C. Course Objectives – (common to all sections)
1. Develop the student's basic knowledge and hands-on skills needed in shop safety.
2. Develop the student's basic knowledge of diesel engine history, engine types, engine parts and classification of diesel engines.
3. Develop the student's basic knowledge and hands-on skills needed in engine disassembly and assembly.

D. Course Objectives -

III. ASSESSMENT MEASURES OF STUDENT LEARNING OUTCOMES:

A. Assessments for the Core Objectives

1. **Critical Thinking Skills** -Critical thinking will be measured through the student's ability to work through problems presented in the classroom or laboratory, and by assessing material in assigned exercises. Critical thinking skills will be assessed using a rubric which incorporates the Angelina College Institutional Rubric for Critical Thinking Skills.
2. **Communication Skills**-Communication skills will be measured through the student's ability to explain the combustion cycle of a diesel engine. Communication Skills will be assessed using a rubric which incorporates the Angelina College Institutional Rubric for Communication Skills.
3. **Empirical and Quantitative Skills**-Students will be instructed on using empirical and quantitative skills

to draw conclusions as they apply to real world applications. Empirical and Quantitative Skills will be assessed using a rubric which incorporates the Angelina College Institutional Rubric for Empirical and Quantitative Skills.

B. Assessments for the Exemplary Objectives Specific to the Course –
NA

C. Assessments for Objectives Specific to the Course –
1. The student will demonstrate knowledge of shop safety by correctly responding to embedded examination questions.
2. The student will demonstrate knowledge of diesel engine history, engine types, engine parts and classification of diesel engines by correctly responding to embedded examination questions.
3. The student will demonstrate knowledge of engine disassembly and assembly by correctly responding to embedded examination questions.

D. Assessments for the Objectives of the Course as determined by the Instructor –

IV. INSTRUCTIONAL PROCEDURES:

This course will be taught utilizing the textbooks, hand out material, computer based information (Internet, Mitchell-on-Demand, Caterpillar SIS), audio-visual aids, lecture, and class discussions.

V. COURSE REQUIREMENTS AND POLICIES:

A. Required Textbooks, Materials and Equipment –
1. Diesel Technology: Fundamentals-Service-Repair
   Andrew Norman-Eighth edition
2. Blackboard-The Supplemental Unit to Critical Thinking
3. Any hand out material deemed necessary by the instructor.
4. See Instructors attached addendum.

B. Assignments – (Appropriate due dates, schedules, deadlines*)*
See attachment A

C. Course Policies – (This course conforms to the policies of Angelina College as stated in the Angelina College Handbook.)

Academic Assistance – If you have a disability (as cited in Section 504 of the Rehabilitation Act of 1973 or Title II of the Americans with Disabilities Act of 1990) that may affect your participation in this class, you should see Karen Bowser, Room 208 of the Student Center. At a post-secondary institution, you must self-identify as a person with a disability; Ms. Bowser will assist you with the necessary information to do so.

Attendance – Angelina College policy will be followed concerning attendance requirements. A student with excessive absences may be dropped by the instructor from the course on a notice to the College Records Office. Excessive absences are defined as three or more consecutive absences or four or more cumulative absences.

Additional Specific Requirements for this Course -

VI. COURSE CONTENT:

A. Content/ Topics - (as required by the individual Instructor)
1. The student will develop a basic knowledge and hands-on skills of shop safety and describe the history of diesel engines and diesel systems and their evolution, demonstrate knowledge of the basic principles of diesel systems and engines and how they function, and utilize precision instruments to diagnose and repair basic systems and engines.
2. See attachment B.

B. Additional Content

VII. EVALUATION AND GRADING:

A. Grading Criteria

A. Major test average will count one-third (1/3)
B. Final examination will count one-third (1/3)
C. Attendance, pop-tests, chapter questions, oral responses and lab work will count one-third (1/3)

B. Determination of Grade

The final grade will be awarded on a basis of:

90-100=A
80-89=B
70-79=C
60-69=D
59 and below=F

VIII. SYLLABUS MODIFICATION:

The instructor may modify the provisions of the syllabus to meet individual class needs by informing the class in advance as to the changes being made.

To report any complaints of discrimination related to disability, you should contact Dr. Patricia McKenzie. Administration Building, Room 105 or (936) 633-5201

IX. As a student enrolled in a Technology & Workforce program, you will encounter certain risks while you are in a classroom, laboratory experience, or in a clinical or practicum setting. In the event that you sustain an injury and/or require any medical testing or care, all resulting medical expenses (hospital, ambulance, or physician fees), are your financial responsibility and not the responsibility of Angelina College or the clinical/practicum site.

DEMR 1405-BASIC ELECTRICAL SYSTEMS
ADDENDUM TO SYLLABUS
DIESEL TECHNOLOGY PROGRAM COURSE POLICIES

The following course policies are implemented, as a part of the course syllabus. The policies are applicable to all students enrolled in the Diesel Technology courses and program.

1. Attendance – Students not present in the classroom when attendance is taken by the Instructor will be marked absent. Students leaving the classroom after class has started will be marked absent. Students having a bona fide emergency who leave the classroom must inform the Instructor prior to leaving. The Instructor will make the determination whether a student's situation is an actual emergency. Angelina College policy will be followed concerning attendance requirements.

2. Demeanor: - Students are expected to conduct themselves appropriately in the classroom and in the laboratory. Professional behavior is expected from diesel technicians in the job market and professional behavior is expected in the classroom and laboratory as well.

3. Weapons and Drugs-Free Campus: Angelina College is a Weapons-free and Drugs-free campus. Weapons are not permitted in the classroom. Drugs are not permitted in the classroom. Students bringing weapons or alcohol/drugs to the classroom or are under the influence of alcohol/drugs, will be ejected from the classroom by the Instructor, Campus Security or Law Enforcement. Consequences for this behavior will range from the student not being permitted to return to the classroom, not being permitted to complete the course, not being permitted to continue studies at the College, up to and including possible arrest by law enforcement.

4. Cell phones/pagers: Cell phones and pagers are not permitted in class. Students are required to take care of personal business prior to or after class sessions. Students are required to turn off cell phones, pagers, etc., during class. Students will not be permitted to leave the classroom to take calls or answer pages after the class session begins.

5. Makeup tests/examinations: Students absent from class when a test or examination is given are required to take the test/examination upon the first day of return to class. Students will makeup the missed test or examination before or after the class session. Students failing to follow this policy will earn a "0" for the test or examination. No makeup test will be given for a missed final examination.

6. Clothing: Students are required to wear clothing acceptable with mechanical work. Sleeveless shirts and short pants are not acceptable. Students are required to wear steel toe boots or shoes. Students are required to purchase O.S.H.A. approved safety glasses or goggles. The safety glasses or goggles will be worn at all times in the laboratory and as required in the classroom.

Attachment A
DEMR 1406
Daily Schedule

Day	Chapter	Lecture	Lab	Reading Assign-ment
1	Norman 2	Safety		Norman Ch. 2
2	1	Safety test introduction to diesel	Engine Disassembly	1
3	1	Introduction to diesel	Engine Disassembly	1
4	1	Introduction to diesel	Engine Disassembly	1
5	1	Introduction to diesel	Engine Disassembly	1
6	1	Review for test	Engine Disassembly	1
7	3	Test	Engine Disassembly	3
8	3	Hand tools	Engine Disassembly	3
9	3	Power tools	Engine Disassembly	3
10	3	Engine measuring tools	Engine Disassembly	3
11	3	Specialized diesel tools	Engine Disassembly	3
12	3	Fasteners	Engine Disassembly	3
13	3	Fasteners	Engine Disassembly	3
14	3	Review for test	Engine Disassembly	3
15	4	Test	Engine Disassembly	4
16	4	Engine components	Engine Disassembly	4
17	4	Engine components	Engine Disassembly	4
18	4	Engine	Engine	4

		components	**Disassembly**	
19	**4**	**Engine classification**	**Clean parts and inspect**	**4**
20	**4**	**Engine classification**	**Clean parts and inspect**	**4**
21	**4**	**Combustion chamber design**	**Clean parts and inspect**	**4**
22	**4**	**Review for test**	**Clean parts and inspect**	**4**
23	**6**	**Test**	**Clean parts and inspect**	**6**
24	**6**	**Crankshaft**	**Clean parts and inspect**	**6**
25	**6**	**Bearing design**	**Clean parts and inspect**	**7**
26	**7**	**Bearing inspection**	**Clean parts and inspect**	**7**
27	**7**	**Review for test**	**Parts list**	**6,7**
28	**1,3,4,6,7**	**Test**	**Parts list**	**1,3,4,6,7**
29	**1,3,4,6,7**	**Review for final exam**		**1,3,4,6,7**
30		**Final Exam**		

Attachment B
Content and Competencies

1. Safety in the shop:
   A. Unit Objectives: Upon completion of this unit the student should be able to:
      1. Recognize and practice safety in selecting and using proper clothing for work in a diesel shop.
      2. Follow the recognized procedures in case of fire in the shop.
      3. Use proper ventilation and exhaust equipment whenever needed.
      4. Follow the first-aid procedures given for the shop class.
      5. Be able to list three (3) types of fire extinguishers and the types of fires on which each should be used.
   B. Unit Content:
      1. Proper clothing
      2. Proper eye protection
      3. Battery safety
      4. Fire extinguisher location and type
      5. Emergency telephone numbers
      6. Compressed air usage
      7. Rubber glove usage
      8. Danger in horse play
      9. Proper tools for the job
      10. Jack and jack stand safety
      11. Oily floor safety
      12. First-aid kit location
      13. High pressure fuel danger
      14. Fire exits in building

15. Grinding and chipping safety
16. Air and electric tool dangers
17. Shop orientation
18. Eye wash station

C. Unit Competencies: Upon completion of this unit the student should be able to:

1. Complete unit test with at least a 100% accuracy
2. Locate fire extinguishers quickly
3. Use jack and jack stands safely
4. Test injectors safely
5. Use air tools and nozzles correctly
6. Be able to list fifteen (15) safety rules
7. Call EMS quickly in case of an emergency
8. Use steam cleaner safely
9. Use cleaning vat safely
10. Use hand and electric tools safely
11. Use chain hoist safely
12. Test and install batteries safely
13. Use grinders and chippers safely
14. Conduct an oral safety briefing

2. Introduction to Diesel Engines:

A. Unit Objectives: Upon completion of this unit the student should be able to:

1. Prepare and give an oral report to the instructor/class on the comparison of the diesel engine and the gasoline engine.
2. List advantages for the diesel engine.
3. Identify engine parts.
4. Name two (2) different operating cycles.
5. Identify block design.
6. Discuss radial, single acting and opposed piston designs.

B. Unit Content:

1. Four cycle operation
2. Two cycle operation
3. Compression ignition
4. Valve operation
5. Timing of events
6. Cylinder arrangement
7. Engine speed
8. Opposed piston operation
9. In-line and V arrangement

C. Unit Competencies: Upon completion of this unit the student should have the competency to:

1. Answer the test questions with at least a 70% accuracy.
2. Discuss the different operations-gas-diesel.
3. Name the strokes of the four cycle engine.
4. Name the strokes of the two cycle engine.
5. Define internal combustion.
6. Discuss different ways to ignite the fuel.
7. Identify all basic engine parts.
8. Discuss air flow into the engine.
9. Discuss timing events.
10. Discuss gasket and seal functions.
11. Discuss the operation of an in-line engine.

12. Discuss the operation of a V and radial engine.
13. Prepare and give an oral report to the instructor/class on cap-screw size and thread design.

3. Engine Disassembly and Reassembly:

A. Unit Objectives: Upon completion of this unit the student should be able to:

1. Answer the test questions with at least a 70% accuracy.
2. To prepare and orally report to the instructor/class on identifying engine make and model.
3. Properly clean engine before disassembly.
4. Use proper disassembly procedures.
5. Measure parts for wear.
6. Identify failed parts and replace.
7. Reassemble engine according to service manual and Mitchell on Demand computer system.
8. Make all pre-start adjustments.
9. Know proper starting procedures.

B. Competencies: Upon completion of this unit the student should have the competency to:

1. Answer the test questions with at least a 70% accuracy.
2. Identify an engine by make and model.
3. Properly clean an engine before disassembly.
4. Drain engine fluids.
5. Remove manifolds and minor accessories.
6. Remove injection pump and injectors.
7. Remove valve cover-rocker arms.
8. Remove cylinder head.
9. Remove water pump.
10. Remove oil pan and oil pump.
11. Remove pistons, rods and cylinder liners.
12. Remove lifters and camshaft.
13. Remove flywheel and housing.
14. Remove crankshaft.
15. Vat engine and scrape gaskets.
16. Clean internal parts.
17. Measure parts for discard or reuse.
18. Install end plates.
19. Install cam bearings.
20. Install main bearings.
21. Install crankshaft.
22. Plastigage main bearings.
23. Torque main caps.
14. Install cylinder liners.
25. Install piston-rod-rings (end gap-side clearance checked).
26. Install rod bearings and caps.
27. Plastigage rod bearings.
28. Torque connecting rod bearings.
29. Install camshaft.
30. Install timing gears.
31. Install lifters.
32. Re-thread tapped holes.
33. Install front cover.
34. Install rear cover.
35. Install front and rear seals.
36. Install oil pump.
37. Install oil pan.
38. Install cylinder head.

39. Install injection pump.
40. Install injectors and injector lines.
41. Install rocker arms.
42. Install flywheel
43. Install manifolds and accessories.