

EASTERN ARIZONA COLLEGE

Diesel Engine Performance

Course Design
2008-2009

Course Information

Division	Industrial Technology Education
Course Number	DSL 230
Title	Diesel Engine Performance
Credits	3
Developed by	Steven Herbert
Lecture/Lab Ratio	1 Lecture/4 Lab
Transfer Status	Non-transferable
Activity Course	No
CIP Code	47.0605
Assessment Mode	Pre/Post Test (15 Questions/15 Points)
Semester Taught	Spring
GE Category	None
Separate Lab	No
Awareness Course	No
Intensive Writing Course	No

Prerequisites

DSL 120

Educational Value

This course is a curriculum requirement for the Diesel Technology AAS degree and Advanced Diesel Technician Certificate.

Description

This Diesel Engine Performance course provides in-depth operational information related to diesel engine fuel, compression, air induction, and exhaust systems. The focus of this course is on diagnosing engine performance concerns by requiring students to follow a strategic process to isolate causes of poor engine performance. Students in this course will have an opportunity to use industry standard hand tooling, repair information systems, and diagnostic equipment. This course helps prepare students for ASE certification test on heavy truck diesel engines.

Supplies

None

Competencies and Performance Standards

1. Apply proper safety procedures and processes.

Learning objectives

What you will learn as you master the competency:

- a. Acquaint self with shop environment and hazards.
- b. Acquaint self with emergency procedures and policy.
- c. Accept responsibility for personal well being and practice / follow safety guidelines.
- d. Acquaint self with material safety data sheets and chemicals used in the shop environment.

Performance Standards

You will demonstrate competence::

- o when learner completes safety assignments and written exam at a satisfactory level.

Your performance will be successful when:

- o learner observes and practices safety procedures.

2. Diagnose poor mechanical performance on diesel engine.

Learning objectives

What you will learn as you master the competency:

- a. Determine cause of engine performance problems due to the engine's fuel and air induction systems.
- b. Interpret engine mechanical performance diagnostic test results.
- c. Determine the causes of oil leaks and unusual noises on a diesel engine.
- d. Determine the causes of unusual orders and exhaust color coming from running diesel engine.

Performance Standards

You will demonstrate competence::

- O When learner completes aligned assignment and job sheets listed in the related learning plan. (The assignment and job sheets must be completed at a satisfactory level to the instructor).
- O When the learner performs the priority tasks listed in the related learning plan. (The tasks must be completed with limited supervision - entry level).

Your performance will be successful when:

- o learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
- o learner provides acceptable oral and / or written responses to questions and / or situations asked by the instructor, while working on the task requirements listed in related learning plan.
- o learner actively participates in the task requirements listed in the related learning plan.
- o learner attends required class and lab sessions and shows up on time.

3. Perform repair procedures on diesel engine fuel system and its vital components.

Learning objectives

What you will learn as you master the competency:

- a. Perform inspection and rebuild fuel injector assembly according to manufacture requirements.
- b. Identify worn and / or out-of-specification diesel fuel system and components.

Performance Standards

You will demonstrate competence:::

- o When learner completes aligned assignment and job sheets listed in the related learning plan. (The assignment and job sheets must be completed at a satisfactory level to the instructor).
- o When the learner performs the priority tasks listed in the related learning plan. (The tasks must be completed with limited supervision - entry level).

Your performance will be successful when:

- o learner is productive, works safely and in a professional manner while working on task requirements listed in related learning plan.
- o learner provides acceptable oral and / or written responses to questions and / or situations asked by the instructor, while working on the task requirements listed in related learning plan.
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- o learner attends required class and lab sessions and shows up on time.

4. Perform repair procedures on air intake boost and exhaust components/assembly.

Learning objectives

What you will learn as you master the competency:

- a. Perform inspection and rebuild turbo charger according to manufacture requirements.
- b. Identify worn and/or out of specification turbo assembly and components.

Performance Standards

You will demonstrate competence:::

- o When learner completes aligned assignment and job sheets listed in the related learning plan. (The assignment and job sheets must be completed at a satisfactory level to the instructor).
- o When the learner performs the priority tasks listed in the related learning plan. (The tasks must be completed with limited supervision - entry level).

Your performance will be successful when:

- O learner is productive, works safely and in a professional manner while working on task requirements listed in related learning plan.
- O learner provides acceptable oral and / or written responses to questions and / or situations asked by the instructor, while working on the task requirements listed in related learning plan.
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- o learner attends required class and lab sessions and shows up on time.

5. Perform engine fuel and air and exhaust system trouble shooting, maintenance service.

Learning objectives

What you will learn as you master the competency:

- a. Determine service schedule related to vehicle's injectors replacement or service intervals.
- b. Demonstrate fuel and air and exhaust system service as recommended by vehicle's manufacturer.
- c. Analyze oil sample results taken from diesel engine oil.

Performance Standards

You will demonstrate competence::

- o When learner completes aligned assignment and job sheets listed in the related learning plan. (The assignment and job sheets must be completed at a satisfactory level to the instructor).
- o When the learner performs the priority tasks listed in the related learning plan. (The tasks must be completed with limited supervision - entry level).

Your performance will be successful when:

- o learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
- o learner provides acceptable oral and / or written responses to questions and / or situations asked by the instructor, while working on the task requirements listed in related learning plan.
- o learner actively participates in the task requirements listed in the related learning plan.
- o learner attends required class and lab sessions and shows up on time.

6. Diagnose engine performance problems that are caused by the engine's computerized fuel system.

Learning objectives

What you will learn as you master the competency:

- a. Perform preliminary diagnostic process and interpret "ET" scan tool data.
- b. Test the engine fuel delivery and injection system.
- c. Perform trouble-shooting techniques to test for proper operation of fuel, air induction, and exhaust systems.
- d. Utilize service reference material to help isolate system component failures.

Performance Standards

You will demonstrate competence::

- o When learner completes aligned assignment and job sheets listed in the related learning plan. (The assignment and job sheets must be completed at a satisfactory level to the instructor.)
- o When the learner performs the priority tasks listed in the related learning plan. (The tasks must be completed with limited supervision - entry level.)

Your performance will be successful when:

- o learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
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Types of Instruction

- Classroom Presentation
- Lab
- Simulated or Actual Work Experience
- Computer-based instruction
- Group activities / cooperative learning
- Totals

Grading Information

Grading Rationale

Grading Weights

- Lab=45%
- Class (Includes Test and Assignments)=45%
- Final Exam (Post Test is the final)=10%

Grading Methods

Class score calculation -

Quizzes, assignments and job sheet points shall be added and carry a weight equal to one test score. All exam shall have equal weight (test scores averaged) and used in class score calculations. Except the final (post test) will be worth at least 10% of the overall final grade calculation.

Lab score calculation

Instructor should evaluate each student's work habits using lab time card. Each student should be evaluated on productivity & progress on task requirements, working in a professional manner, clean-up and safe work habits.

Instructor is also required to evaluate each student's skill level in achieving the task requirements outlined in the various learning plans.

Instructors are encouraged to reward students for showing up on time and attending each class & lab session. Students should not be late for classes if so this will fall under the attendance policy of Freeport McMoran, Inc. under the guiding principle

This can be done by requiring students to make arrangement with the instructor to make-up any lost time prior to missed day. Any missed day must meet Phelps Dodge attendance policy and must be arranged with instructor and supervisor prior to class. All students need to notify the instructor of sick days through attendance coordinator voice mail, etc. on the day of sickness. Instructors should not allow for any work to be turned in late or any test made up with out some type of deduction for late assignments / test.

Suggested deduction 50% of original score.

Grading Scale

A 90% - 100%

B 80% - 89%

C 70% - 79%

D 60% - 69%

F Below 60%

Pass/Fail A non-major student may choose to have a grade of P or F rather than a letter grade. A grade of P will require that the student receive a percentage grade of at least 68%. A grade less than this will result in a grade of F.