Course Information

Division: Industrial Technology Education
Course Number: DSL 220
Title: Advanced Diesel Engines
Credits: 4
Developed by: Steven Herbert
Lecture/Lab Ratio: 2 Lecture/6 Lab
Transfer Status: Pending Evaluation
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 course provides in-depth operational information related to heavy duty diesel engine fuel, compression, air induction, and exhaust systems. It is the intent of this course to teach diagnosis and repair of mechanical engine concerns. Course requires students to isolate and repair mechanical engine, fuel, and air induction system concerns by requiring students to follow a strategic process. Students in this course will have an opportunity to use industry standard tooling, repair information systems, and engine repair processes. This course helps prepare students for ASE certification test on heavy truck diesel engines.
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 your 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 diesel engine’s overall mechanical condition.
   
   **Learning objectives**
   
   *What you will learn as you master the competency:*
   
   a. Determine mechanical condition of engine assembly and its internal components.
   b. Interpret engine 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 your 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 diesel engine fuel system component service and fuel system set-up procedures.
   
   **Learning objectives**
   
   *What you will learn as you master the competency:*
   
   a. Perform fuel system inspection, remove and install fuel injector assembly according to manufacture requirements.
b. Identify worn and/or out-of-specification diesel fuel system components.
c. Install and set-up fuel system injection pump according to mfg. procedures.

**Performance Standards**

You will demonstrate your competence:

- 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).
- 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:

- learner is productive, works safely and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- learner actively participates in the task requirements listed in the related learning plan.
- learner attends required class and lab sessions and shows up on time.

4. **Perform repair procedures on diesel engine’s air intake boost and exhaust components/assembly.**

**Learning objectives**

What you will learn as you master the competency:

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

**Performance Standards**

You will demonstrate your competence:

- 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).
- 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:

- learner is productive, works safely and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- learner actively participates in the task requirements listed in the related learning plan.
- learner attends required class and lab sessions and shows up on time.

5. **Perform engine cooling system service.**

**Learning objectives**

What you will learn as you master the competency:

- Determine PM service schedule related to various diesel equipment cooling system.
- Demonstrate cooling system service as recommended by equipment manufacturer.
**Performance Standards**

You will demonstrate your competence:

- 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).
- 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:

- Learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- Learner actively participates in the task requirements listed in the related learning plan.
- Learner attends required class and lab sessions and shows up on time.

6. **Perform repair procedures on engine block components / assembly.**

**Learning objectives**

What you will learn as you master the competency:

- a. Perform short block rebuild process (remove, inspect, repair, and install engine block internal components).
- b. Identify worn and / or out-of-specification engine block assembly and internal components.

**Performance Standards**

You will demonstrate your competence:

- 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).
- 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:

- Learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- Learner actively participates in the task requirements listed in the related learning plan.
- Learner attends required class and lab sessions and shows up on time.
7. Perform repair procedures on cylinder head and valve train components / assembly.

What you will learn as you master the competency:

a. Perform cylinder head rebuild process according to manufacture requirements.
b. Identify worn and/or out of specification cylinder head assembly and components.

Performance Standards

You will demonstrate your competence:

- 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).
- 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:

- learner is productive, works safely and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- learner actively participates in the task requirements listed in the related learning plan.
- learner attends required class and lab sessions and shows up on time.

8. Diagnose concerns with diesel engine lubrication system to determine needed repairs.

Learning objectives

What you will learn as you master the competency:

a. Determine needed repairs on engine's lubrication system and its components.

Performance Standards

You will demonstrate your competence:

- 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).
- 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:

- learner is productive, works safely, and in a professional manner while working on task requirements listed in related learning plan.
- 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.
- learner actively participates in the task requirements listed in the related learning plan.
- learner attends required class and lab sessions and shows up on time.
Types of Instruction
Classroom Presentation
Lab
Simulated or Actual Work Experience
Computer-based instruction
Group activities / cooperative learning

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 Phelps Dodge 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 Freeport McMoran, Inc. 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.