

**SAN DIEGO COMMUNITY COLLEGE DISTRICT  
MIRAMAR COLLEGE  
ASSOCIATE DEGREE COURSE OUTLINE**

**SECTION I****SUBJECT AREA AND COURSE NUMBER:** Diesel Technology 124**COURSE TITLE:** Diesel Engines D**Units: 7**  
Grade Only**CATALOG COURSE DESCRIPTION:**

Students learn the fundamental skills necessary to perform major overhaul operations on Cummins diesel engines. Subjects include theory of operation, construction and application, how to use diesel repair shop equipment and tools, and dynamometer performance testing.

**REQUISITES:**

**Corequisite: Completion of or concurrent enrollment in:**  
DIES 100 with a grade of "C" or better, or equivalent

**FIELD TRIP REQUIREMENTS:** May be required**TRANSFER APPLICABILITY:** Associate Degree Credit & transfer to CSU and/or private colleges and universities**TOTAL LECTURE HOURS:** 64 - 72**TOTAL LAB HOURS:** 144 - 162**STUDENT LEARNING OBJECTIVES:**

Upon successful completion of the course the student will be able to:

1. Describe the Cummins diesel engine theory of operation
2. Explain Cummins diesel engine construction and application
3. Identify and differentiate the major operating systems of Cummins diesel engines
4. Demonstrate the proper use of common diesel repair shop and engine specific tools and equipment
5. Prepare written progress and repair records and compose engine evaluation reports
6. Demonstrate how to disassemble and assemble a Cummins diesel engine
7. Assess whether major engine parts and components are serviceable
8. Demonstrate how to prepare an engine for performance testing
9. Demonstrate how to conduct dynamometer performance testing.

**SECTION II****1. COURSE OUTLINE AND SCOPE:****A. Outline Of Topics:**

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

- I. Cummins diesel engine's theory of operation
  - A. Combustion theory
  - B. Operating principles.
- II. Construction and application of Cummins diesel engines
  - A. Major engine parts/components and their relationships
  - B. Service applications.
- III. Major operating systems of Cummins diesel engines
  - A. Fuel
  - B. Lubrication
  - C. Cooling
  - D. Air inlet
  - E. Exhaust.
- IV. Use of common diesel-repair shop and engine-specific tools and equipment
  - A. Engine disassembly and assembly
  - B. Performance preparation adjustments
  - C. Performance testing.
- V. How to prepare progress and repair records and compose engine evaluation reports
  - A. Shop notebook
  - B. Engine performance report.
- VI. Serviceability of major engine parts and components
  - A. Guidelines for reusability of parts
  - B. Guidelines for reusability of components.
- VII. Performance testing
  - A. Engine tune-up
  - B. Pressurization of fuel and lubrication systems
  - C. Installation of exhaust system
  - D. Installation of safety devices.
- VIII. Dynamometer test run procedures
  - A. Pre-test preparation
  - B. Test and run-in
  - C. Test reports.

**B. Appropriate Outside Assignments:**

Outside assignments may include, but are not limited to, the following:

- I. 1. Conducting research
- II. 2. Completing all reading and writing assignments, including a shop notebook and an engine performance report
- III. 3. Completing field assignments/projects.

**C. Writing Assignments:**

Writing assignments are required and may include, but are not limited to, the following:

- I. 1. Preparing a shop notebook
- II. 2. Writing an engine performance report
- III. 3. Responding to short essay questions about related topics such as the operation, assembly/disassembly, and/or repair of Cummins diesel engines.

**D. Reading Assignments:**

Reading assignments are required and may include but, are not limited to, the following:

- I. 1. Chapters from course textbook(s)
- II. 2. Articles related to diesel repair in professional journals such as Service Tech, Diesel Progress, Commercial Carrier Journal (CCJ), Utility Fleet, Fleet Owner, and Transportation Equipment News
- III. 3. Reports, repair manuals, on-line resources, and laboratory guides associated with diesel technology.

**E. Appropriate Assignments that Demonstrate Critical Thinking:**

Critical thinking assignments are required and may include, but are not limited to, the following:

- I. 1. Analyzing methods learned in class and utilizing appropriate methods for completing laboratory tasks
- II. 2. Evaluating and recording the condition of major Cummins diesel engine components
- III. 3. Formulating repair plans for major Cummins diesel engine components
- IV. 4. Calculating and solving mathematical problems.

## **2. METHODS OF EVALUATION:**

A student's grade will be based on multiple measures of performance unless the course requires no grade. Multiple measures may include, but are not limited to, the following:

- I. Performing manipulative skills as needed to complete laboratory assignments satisfactorily
- Successfully applying theory to laboratory assignments
- Performing on written, oral, and/or practical examinations
- Performing on out-of-class assignments including diesel engine reports and projects
- Contributing to class discussion
- Maintaining attendance per current department policy.

## **3. METHODS OF INSTRUCTION:**

Methods of instruction may include, but are not limited to, the following:

- \* Lecture
- \* Lecture Discussion
- \* Computer Assisted Instruction
- \* Laboratory
- \* Discussion Seminar
- \* Lecture-Lab Combination
- \* Learning Modules
- \* Audio-Visual
- \* Collaborative Learning
- \* Shadowing
- \* Other (Specify)
- \* A. Demonstration
- \* B. Field trips and/or field assignments.

## **4. REQUIRED TEXTS AND SUPPLIES:**

Textbooks may include, but are not limited to:

### **TEXTBOOKS:**

1. Dagle, John F., and Robert N. Brady. Diesel Engine and Fuel System Repair, 5th ed. Prentice-Hall, 2002, ISBN: 0130929816
2. Lewis, Jim. DIES-M Daily Reports, 2nd ed. Miramar Reprographics, 1976,

### **MANUALS:**

### **PERIODICALS:**

### **SOFTWARE:**

### **SUPPLIES:**

1. Shop notebook (8 1/2 x 11" spiral bound)
2. Safety glasses
3. Calculator
4. Appropriate clothing and footwear for shop work
5. Scantron answer sheets

**ORIGINATOR:** James Cargill

**CO-CONTRIBUTOR(S)**

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