

**DET 182A Course Outline as of Fall 2018****CATALOG INFORMATION**

Dept and Nbr: DET 182A Title: DIESEL ENGINE SYSTEMS

Full Title: Diesel Engine Systems

Last Reviewed: 1/22/2018

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.25	17.5	Lecture Scheduled	39.38
Minimum	3.00	Lab Scheduled	2.25	8	Lab Scheduled	39.38
		Contact DHR	0		Contact DHR	0
		Contact Total	4.50		Contact Total	78.75
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 78.75

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: DET 82A

**Catalog Description:**

The operating principles and overhaul of the heavy duty diesel engine and related systems. Course involves disassembly and reassembly of engines, using service manuals to inspect components and analyze component failures.

**Prerequisites/Corequisites:****Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100 AND Course Completion or Concurrent Enrollment in DET 179

**Limits on Enrollment:****Schedule of Classes Information:**

Description: The operating principles and overhaul of the heavy duty diesel engine and related systems. Course involves disassembly and reassembly of engines, using service manuals to inspect components and analyze component failures. (Grade Only)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100 AND Course Completion or Concurrent

Enrollment in DET 179

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:

<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
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<b>CSU Transfer:</b>	Effective:	Inactive:
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<b>UC Transfer:</b>	Effective:	Inactive:
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**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Disassemble and diagnose heavy duty engine failures.
2. Repair internal engine defects using approved repair procedures.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Differentiate among types of internal combustion engines.
2. Describe the fundamentals of internal combustion engine operation.
3. Interpret instructions in a service manual to successfully disassemble and reassemble an engine.
4. Measure, inspect, and evaluate serviceable diesel engine components using precision measurement tools and compare data to manufacturers' specifications.
5. Diagnose internal engine component failure.

### **Topics and Scope:**

#### **I. Engine Fundamentals**

- A. Engine types and design
- B. Theory and principles of operation
- C. Internal engine diagnosis
- D. Engine removal procedures
- E. Engine disassembly
- F. Engine cleaning and inspection
- G. Service manuals and information

#### **II. Blocks and Liners**

- A. Engine block inspection and service
- B. Liner inspection and service

- III. Crankshafts
  - A. Crankshaft inspection and service
  - B. Crankshaft measurement
  - C. Crankshaft bearings and clearance
- IV. Pistons, Rings, Connecting Rod Service
  - A. Piston inspection and service
  - B. Piston ring identification and service
  - C. Connecting rod inspection
- V. Cylinder Head Service
  - A. Valve and seat inspection
  - B. Head inspection and service
- VI. Camshafts
  - A. Camshaft inspection and measurement
  - B. Camshaft drive systems
  - C. Camshaft timing set-up
- VII. Engine Set-up
  - A. Valve adjustment
  - B. Injector timing
- VIII. Engine Lube Systems
  - A. Engine oils, filters
  - B. Lube pump and system
- IX. Engine Cooling System
  - A. Coolant and additives
  - B. Cooling system components
  - C. Cooling systems diagnosis and repair
- X. Engine Assembly Procedures

All topics are covered in both the lecture and lab parts of the course.

### **Assignment:**

#### Lecture-Related Assignments:

1. Reading, 40 - 60 pages per week
2. Ten to fifteen tests including final exam

#### Lab-Related Assignments:

1. Disassemble engine and measure critical engine components in order to compare to manufacture's specifications
2. Analyze engine components for wear
3. Perform engine reassembly according to manufacturer's instructions
4. Complete NATEF (National Automotive Technicians Education Foundation) recommended task sheets
5. Daily work logs (work assigned, work completed)

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Daily work logs	Writing 0 - 25%
<b>Problem Solving:</b> Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.	
Engine diagnosis and component analysis; NATEF task sheets	Problem solving 10 - 30%
<b>Skill Demonstrations:</b> All skill-based and physical demonstrations used for assessment purposes including skill performance exams.	
Engine disassembly and assembly	Skill Demonstrations 10 - 30%
<b>Exams:</b> All forms of formal testing, other than skill performance exams.	
Tests including final exam	Exams 20 - 50%
<b>Other:</b> Includes any assessment tools that do not logically fit into the above categories.	
None	Other Category 0 - 0%

### **Representative Textbooks and Materials:**

Fundamentals of Medium/Heavy Duty Diesel Engines. Wright, Gus. Jones and Bartlett Learning. 2017  
Instructor prepared materials