

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

Dept and Nbr: DET 182B Title: DIESEL FUEL SYSTEMS

Full Title: Diesel Fuel 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 82B

**Catalog Description:**

An in-depth study of heavy duty diesel engine fuel and electronic control systems. Students perform service, maintenance and diagnosis of diesel engine fuel systems.

**Prerequisites/Corequisites:**

Course Completion of DET 182A

**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100; and DET 179

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

Description: An in-depth study of heavy duty diesel engine fuel and electronic control systems. Students perform service, maintenance and diagnosis of diesel engine fuel systems. (Grade Only)

Prerequisites/Corequisites: Course Completion of DET 182A

Recommended: Eligibility for ENGL 100 or ESL 100; and 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. Diagnose and repair modern diesel engine fuel systems.
2. Diagnose and repair electronically controlled engines.

**Objectives:**

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

1. Carry out diagnostic procedures to deduce necessary repairs and perform tune-up procedures to correct engine performance.
2. Identify and evaluate electronic systems components.
3. Perform diagnosis and repairs on an electronic control system.
4. Identify different types of engine fuel systems.
5. Use engine tune-up and diagnostic tools and instruments effectively.
6. Discuss and apply personal, shop, and environmental safety procedures.

**Topics and Scope:**

- I. Diesel Fuel Systems and Components\*
  - A. Diesel fuel properties and characteristics
  - B. Low-pressure fuel systems
  - C. Functions of high-pressure systems
  - D. Hydraulic nozzles
  - E. Governors
  - F. Multiple plunger injection pumps
  - G. Mechanical distributor injection pumps
- II. Electronic Signaling and Sensors\*
  - A. Electronic signal processing principles
  - B. Sensors
- III. Electronic Injection Systems and Components\*
  - A. Electronic distributor injection pumps

- B. Electronic unit injectors and unit pumps
- C. Cummins unit injection system
- D. Hydraulically acutuated electronic unit injector systems
- E. Common rail fuel systems

IV. Air Induction and Exhaust Systems\*

- A. Air induction systems
- B. Fixed geometry and wastegated turbochargers
- C. Variable geometry and series turbochargers
- D. Exhaust gas recirculation
- E. Charge air cooling
- F. Exhaust aftertreatment systems
- G. Exhaust systems and engine retarders
- H. On-Board diagnostics

V. Hybrid Systems and Alternate Fuels

- A. Hybrid drive systems and series-type hybrid drives
- B. Alternative fuels properties and charateristics
- C. Natural gas combustion systems

\*The above sections are covered in both Lecture and Lab.

**Assignment:**

Lecture-Related Assignments:

1. Read 40 to 60 pages a week
2. Ten to fifteen tests to include final

Lab-Related Assignments:

1. Perform engine diagnostic tests
2. Evaluate engine performance and correct deficiencies
3. Complete NATEF (National Automotive Technicians Education Foundation) recommended task sheets
4. 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 log
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Writing 0 - 25%
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**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Task Sheets
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Problem solving 10 - 30%
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**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Engine diagnostics tests and repairs

Skill Demonstrations  
10 - 30%

**Exams:** All forms of formal testing, other than skill performance exams.

Tests to include final

Exams  
20 - 50%

**Other:** 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