

Department:

Diesel Technology

Course Description:

This course teaches the operating of fuel systems used on most modern diesel engines, how they differ from one another, and service and adjustment of each system.

Course Competencies:

Upon completion of the course, the student should be able to:

1. Trace fuel flow through basic fuel systems.
2. Check fuel level, quality, and consumption.
3. Inspect and service basic fuel supply components.
4. Isolate, remove, test, rebuild or replace, and reinstall injection nozzles.
5. Isolate, remove, test, and reinstall or replace mechanical unit injectors.
6. Inspect, test, adjust, and time a distributor-type (rotary) injection pump; determine needed repairs.
7. Inspect, test, and adjust a PT injection pump and time the injectors; determine needed repairs.

Course Content:

- A. Diesel Fuels
 1. Hydrocarbon Fuels
 2. Diesel Fuel Grades
 - a) Diesel Fuel Properties
 3. Fuel Additives
 4. Fuel Handling and Storage
 - a) Storage Tanks
- B. Basic Fuel Systems
 1. Fuel System Components
 - a) Fuel System Operating Fundamentals
 - b) Fuel Delivery System
 2. Fuel Tanks
 - a) Fuel Tank Material
 - b) Dual Fuel Tanks
 3. Fuel Lines
 - a) Heavyweight Fuel Lines
 4. Fuel Transfer Pumps (Supply Pumps)
- C. Fuel Filters and Conditioners
 1. Damage by Dirt and Water
 2. Filtration Devices
 - a) Sedimenters
- D. Injection System Fundamentals
 1. Diesel Fuel Injection Systems

- a) Types of Fuel Injection Systems
 - 2. Timing
 - a) Fuel Metering
 - 3. Electronic Metering Systems
- E. Injection Nozzles
 - 1. Nozzle Holders
 - 2. Servicing Fuel Injector Holders and Nozzles
- F. Governors and Acceleration Controls
 - 1. Governing Engine Speed
 - a) Classification of Governors
- G. Multiple Plunger Inline Injection Pumps
 - 1. Inline Injections Pumps
 - 2. Inline Injection Pump Components
 - a) Inline Pump Components
 - 3. Basic Troubleshooting
 - a) Relief Valve Pressure Check
- H. Distributor Injection Pumps
 - 1. Distributor Injection Pumps
 - a) Distributor Pump Components
- I. Unit Injector Fuel Injection Systems
 - 1. Injection Systems
 - a) Basics of Unit Injection (Two-stroke Engines)
 - 2. Injector Service (Two-Stroke Engines)
- J. Cummins Pressure-Time Injection Systems
 - 1. Injection Systems
 - a) Pressure-Time (PT) Fuel Injection
 - 2. PT Pump Checks and Adjustments
 - a) Idle Speed Adjustments
 - 3. Step Timing Control (STC)

Learning Assessments:

Competencies will be assessed by assignments, case problems, quizzes, chapter tests, hands-on projects, lab assignments, a midterm test, and a final test. The test can be in the objective format or in a problem solving format.

Instructional Materials:

Textbook: Mack, James P., Daniels, Jason A., DeHart, Mark A., and Norman, A. (2022). *Diesel Engine Technology* (9th ed.). Tinley Park, IL: The Goodheart-Willcox Company, Inc. ISBN-13: 978-1-64564-685-3

Workbook: Mack, James P., Daniels, Jason A., DeHart, Mark A., and Norman, A. (2022). *Diesel Engine Technology* (9th ed.). Tinley Park, IL: The Goodheart-Willcox Company, Inc. ISBN-13: 978-1-64564-686-0

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be

provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the “Disabilities Self-Identification Form” on our [Disability Services website](#).

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an [online report](#) about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our [Equity Grievance Policy](#).