

Department:

Transportation Division; Diesel Technology Program

Course Description:

This course teaches the three major engine companies products. Training engines are provided for all classes to ensure the student's knowledge of troubleshooting maintenance, disassembly, overhaul, and reassembly techniques. Training is further enhanced by class discussion and visual media.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents.

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

1. Identify cylinder head, camshaft & valve train
2. Operate cylinder head, camshaft & valve train
3. Identify cylinder block
4. Reassemble cylinder block
5. Identify lubrication system
6. Reassemble lubrication system
7. Identify cooling system
8. Reassemble cooling system
9. Identify internal engine components
10. Reassemble internal engine components
11. Identify proper use of sealing mediums
12. Install proper use of sealing mediums
13. Demonstrate proper use of sealing mediums
14. Identify timing procedures
15. Demonstrate timing procedures
16. Identify various exhaust and intake systems
17. Install various exhaust and intake systems
18. Determine required tools for various tasks Course Competencies
19. Evaluate worn engine components
20. Determine possible causes of engine component failures
21. Steam clean an engine
22. Remove engine accessories and external lines
23. Remove the engine from the chassis
24. Disassemble engine into component parts
25. Service and install oil pump and oil pump drive components
26. Service and inspect lubricating system screens and pipes
27. Service and inspect oil pressure regulator valve and bypass valves
28. Service and inspect oil cooler and lines

29. Flush, refill, and bleed coolant system
30. Inspect water pump, belts, and hoses
31. Check operation of fan assembly and controls
32. Test operation of thermostat installed in engine
33. Test operation of thermostat on the bench
34. Check operation and accuracy of temperature indicating system
35. Pressure test a cylinder block
36. Disassemble and clean a cylinder block
37. Inspect a cylinder block
38. Install new camshaft bushings
39. Clean and inspect cylinder bores
40. Install cylinder liners and set liner protrusion
41. Remove, clean, and inspect a crankshaft
42. Perform an in-frame bearing roll0in
43. Inspect viscous vibration damper/harmonic balancer
44. Inspect bonded vibration damper/harmonic balancer
45. Inspect flywheel
46. Remove, disassemble, and inspect a piston and connecting rod assembly
47. Measure piston-to-cylinder wall clearance and ring end gap
48. Assemble and install piston and connecting rod assemble
49. Remove, clean, and inspect a camshaft
50. Remove, inspect, and install cam bushings
51. Install a camshaft and set cam timing
52. Locate and label intake and exhaust valves
53. Clean and inspect a cylinder head
54. Recondition a cylinder head
55. Install a cylinder head assembly and adjust valves

Course Content:

- A. Pistons, Rings, and Connecting Rods
 - 1) Diesel Pistons
 - a) Piston Designs
 - b) Types of Pistons
 - c) Cam Ground pistons
- B. Cylinder Heads and Related Components
 - 1) Cylinder Head
 - a) Cylinder Head Studs and Gaskets
 - b) Disassembling a Cylinder Head
 - c) Cylinder Head Removal
 - 2) Valves
 - a) Valve Stem and Seat
 - b) Valve Construction
 - c) Valve Guides
- C. Camshaft and Valve train Components
 - 1) Valve Train Operating Mechanisms
 - a) Camshafts
 - b) Cam Lobes
 - c) Camshaft Gear
 - d) Valve Operation
 - 2) Inspecting and Servicing the Valve Train
 - 3) Assembling the valve Train Components

- D. Lubrication Systems
 - 1) Lubricating Systems
 - 2) Lubricating System Components
 - 3) Oil Pressure Indications Systems
 - 4) Engine Oil
- E. Cooling Systems
 - 1) Cooling Systems
 - a) Types of Cooling Systems
 - b) Coolants
 - c) Radiator Systems
 - 2) Hoses
 - 3) Cleaning and Replacing Cooling
- F. Air Intake Systems
 - 1) Air intakes
 - a) Factors Affecting Air Intake Efficiency
 - 2) Scavenging and Supercharging
 - 3) Air Cleaners
 - 4) Intake Air Silencers
- G. Exhaust Systems
 - 1) Exhaust System
 - a) Back Pressure
 - 2) Exhaust System Components
 - 3) Exhaust System Service
 - 4) Turbochargers

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](#).