

## Class Syllabus Winter 2022

Diesel engine exploration CST 224 34797

07:00am:10:50 ATH-104

Instructor John Alvin (541)917-4613

Jan 3th to March 18

Office hours 11-12 T-Th

[alvinjo@linnbenton.edu](mailto:alvinjo@linnbenton.edu)

**Heavy equipment diesel department policy: Failure to wear face coverings in the class rooms, shop and labs that cover the mouth and nose at all times Will result in you being removed from lab class for that day after the second warning. Continued failure to wear face coverings after being removed from the class for the day will result in the removal from all lab classes for the remainder of the term.**

## Masks Required Statewide

CLASSROOM REQUIREMENTS FOR ALL STUDENTS AND FACULTY DUE TO COVID-19

Linn-Benton Community College has established rules and policies to make the return to the classroom as safe as possible. It is required for everyone to follow all of the campus rules and policies. To participate in this class, LBCC requires all students to comply with the following:

- [Wear a mask or face covering](#) indoors at all times. Your mask or face covering must be properly worn (fully covering nose and mouth and tight-fitting). Mesh masks, face shields, or face covering that incorporates a valve designed to facilitate easy exhalation are not acceptable. If you have a medical condition or a disability that prevents you from wearing a mask or cloth face covering, you must obtain an accommodation from CFAR (Center for Accessibility Resources) to be exempt from this requirement. **State guidelines do not limit** class size. Physical distancing accommodations can be made upon request and cleaning supplies are also available for personal use.

**Safety:** The safety of our students is our primary concern at LBCC adherence to safety and conduct policies are rigorously enforced

Text required: **CDX Medium and Heavy vehicles/CDX Engines book active licence**  
**Required Materials: Laptop or tablet 8x11” capable of CDX, Service Advisor and Parts advisor.**

**Lap top or tablet** ( if doing it on your phone does not work you are still responsible for the assignment deadlines)

**Theme Cover** to turn in “Lab book”

OSHA Approved Safety Glasses must be provided by the student

OSHA Approved Muff style hearing protection

**Clean coveralls** and must be worn and kept clean.

**Thumb drive** 5 gig or bigger.

**Student file link for winter 2022**

**This course will be lecture and lab class wit elements of self study and research.**

Lecture posting as produced and posted to the google drive .

The “Recorded lecture file” will be a good reference.

**Class notes** A copy of your lecture notes will be required on monday following the lecture

**Media assignments:** Email/print and turn in a **5 line summary** each video to show that you viewed the video before attending lab . ( **AS per assigned** )

**The Daily Journal assignment**

**Think of this as a time card entry.** Each day a few lines describing what you are doing on your engine project. ( ie measuring the crank shaft for out of round and taper, replaced cam bearings.)

**Note:** All Assignments must be type written)

## **Course Objectives**

To provide students with instruction and practice in diesel engine operation.

Provide perspective of diesel engine development and technology.

Explain the advantage of compression ignition and high compression ratio engines.  
Explain why the diesel engine has such high efficiency and torque.

## **Course Description**

This course covers operating principles, maintenance, repair, and inspection of diesel engines. In addition, students will study standardized manufacturer specifications as they pertain to correct operation and performance. Students will disassemble and measure each engine component to evaluate it for reapplication or remanufacture. The class is geared more to understanding of the operational principles thereof for diagnostics rather than the remanufacturing of a diesel engine but both go hand in hand.

## **Course student learning outcomes**

- 1 Demonstrate safe use of tools in engine repair
- 2 Troubleshoot diesel and high compression gas engines
- 3 Repair diesel and high compression gas engines
- 4 Maintain diesel and high compression gas engines

**Assessments of Student Learning Outcomes** Assessment:

Written test questions, hands-on evaluations, and lab projects

**Absences Policy:** Eight undocumented absences in an 11 week class, or four undocumented absences in a 5 week class, shall result in an automatic course grade of "F" for material nonparticipation.

Only absences covered through the Center for Accessibility Resources documentation, or DOCUMENTED emergency absences (for yourself only) will be excused. Job conflicts, oversleeping, car trouble, travel delays, traffic jams, and other minor life events are not considered emergencies.

Documentation must be physically handed to the instructor within five (5) business days (Monday through Friday) of the absence for it to be excused.

**Safety:** The safety of our students is our primary concern at LBCC adherence to safety and conduct policies is rigorously enforced.

NIOSH Z-87 approved eye protection is required at all times in the lab.

Closed toed work shoes are required.

Clothing shall be properly fitted and worn correctly.

Jewelry should not be worn while working.

Tie up long hair securely, and/or tuck it into a cap.

Hearing protection required when sound levels exceed OSHA threshold limits (running engines, air tools, and power tools, etc.)

Report all injuries to your instructor immediately.

Proper safety stands are required when working under lifted equipment.

Front and rear ground guides are required when moving equipment into and out of the shop.

**Uniform:** Sponsorship shirt/program uniform shirt.

No student will be admitted to class not wearing an approved by Diesel Department uniform.

This will result in a forfeiture of daily grade.

Uniform will consist of:

**Clean** sponsorship **uniform shirt**, or Clean Snap-On uniform shirt

Clean preferably dark denim **work pants**

OSHA Approved **Safety glasses** (worn in the lab at all times)

Preferably dark **Leather shoes**

**Notepad** 1 pen and pencil. Small working flashlight

**OSHA** Approved ear muffs to be worn during high noise conditions.

**Clean** and maintained coveralls worn in the shop during all lab activities.

Students will not participate in lab activities without proper uniform and will be removed from lab till proper uniform is met.(forfeiture of professionalism grade will result.

## **Learning Styles and Resources**

We will use lecture-discussion, multimedia presentations and electronic data base materials.

If you are having difficulty with any of the concepts or procedures in this course, or have a preferred learning style, do not hesitate to talk with me. I am available for consultation or tutoring and will work with you to explore the many resources available to make your education more successful.

The Learning Center is an excellent resource for improving your skills as a lifelong learner and is a great place to study and do homework. They have computers, mini courses on study skills and a very helpful staff. They will help you with any subject you are taking at LBCC.

## **Grading System**

Student progress may be discussed at any point during the quarter. Grade definitions are outlined in the general catalog.

A - 90%-100%

B - 80%-89%

C - 70%-79%

D - 60%-69%

F - Below 60%

IN - Available with student initiated grade contract

AU - Audit classes do not apply to certificate or degree

W - Student must select this grade prior to the end of the second week of class for a full refund.

**John Deere C and F Pape And Coastline Students must complete** pass assigned JDU courses

to earn a passing grade in this course See JDU completion list in student files google drive or seek out a hard copy from John Alvin. It is the individual student's responsibility to seek out required classes.

**John Deere Agricultural Students must complete** pass assigned JDU courses

to earn a passing grade in this course See JDU completion list in student files google drive or seek out a hard copy from John Alvin.

It is the individual student's responsibility to seek out required classes.

**Pape Kenworth Students must complete** pass assigned Kenworth online courses

to earn a passing grade in this course See Kenworth fleet training list in student files google drive or seek out a hard copy from John Alvin.

It is the individual student's responsibility to seek out required classes.

<https://drive.google.com/drive/folders/1mHRZfZ09jxmC9uL06JM-XdWfyEGECSJP?usp=sharing>

**Final Grade:** Determined by the following breakdown:

Homework / Tests, Lab book	30%
Lab Projects /	30%
Work Habits	15%
Mid Term Exam Final Exam	10%
Lecture notes	15

**Shop clean-up is the responsibility of all students in this class.**

Shop clean up will start 20 minutes before the end of class.

Any work area that is left in unsatisfactory condition at the end of lab, must be cleaned by students responsible, and approved by the **instructor** or **Instructional assistant** before students will be allowed to continue with any lab projects.

Shop clean up will include:

Any trash put in trash cans

Hoses and cords properly stored

All shop and specialty tools put away

Student tool boxes returned to proper area and tools maintained.

Floor swept and oil pads picked up and disposed of.

Any fluid spills must be cleaned up immediately

**Tool Policy:**

- Students are responsible for the use, care, maintenance, and inspection of tools in their custody.
- Students are responsible for their assigned toolbox and its contents. Missing tools will be replaced at the responsible student's expense
- Tools will be cleaned, returned to their storage location(s), and checked in at the end of class

[Student Success Resource Guide -- Virtual Version](#)

[https://docs.google.com/document/d/1cgNhy-Rd35zVZf9J\\_1gwH-8\\_XgUjmgVRXZRMVux-oM/edit#](https://docs.google.com/document/d/1cgNhy-Rd35zVZf9J_1gwH-8_XgUjmgVRXZRMVux-oM/edit#)

<https://www.linnbenton.edu/current-students/student-support/center-for-accessibility-resources/>

### **Request for Special Needs or Accommodations** 1-03-2020

Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency should speak with their instructor during the first week of class. If you believe you may need accommodations but are not yet registered with the Center for Accessibility Resources (CFAR), please visit the [CFAR Website](#) for steps on how to apply for services or call (541) 917-4789.

### **LBCC Comprehensive Statement of Nondiscrimination**

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy P1015 in our [Board Policies and Administrative Rules](#). Title II, IX, & Section 504: Scott Rolen, CC-108, 541-917-4425; Lynne Cox, T-107B, 541-917-4806, LBCC, Albany, Oregon. To report: [linnbenton-advocate.symplicity.com/public\\_report](http://linnbenton-advocate.symplicity.com/public_report)

### **Course outcomes**

- 1 Demonstrate safe use of tools in engine repair
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## Course content as per AED accreditation requirements

**Week 1** Safety, informational resources, engine components, operation, terminology timing diagrams, disassembly procedures and sequence **AED 5.1 p53**

### **Week 2 CO 2**

Precision measurement, basic engine components and operation **AED 5.2 P56**

### **Week 3 CO 2,3**

Cylinder heads, blocks **AED 5.6 P61**

### **Week 4 CO 2,3**

Crankshaft, Cylinder sleeves **AED 5.6 P61**

### **Week 5 CO 2,3**

Connecting rods, pistons, rings, midterm exam **AED 5.6 P61**

### **Week 6 CO 2,3**

Engine valves and valve trains **AED 5.6 P61**

### **Week 7 CO 2,3**

Lubricating and cooling system **AED 5.5 5.6 P60 P61**

### **Week 8 CO 2,3**

Engine induction and forced induction Turbocharging/supercharging **AED 5.6 P60**

### **Week 9 CO 2,3,4**

Engine troubleshooting **AED 5.8 P64**

### **Week 10 CO 1, 2,3,4**

Engine subsystems and auxiliary systems **AED 5.6 P60 5.7 P62,63,64**

### **Week 11 Final exam**



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I have read this document and understand it's content.  
By signing this document I agree to and agree to abide by its policies.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Engines class Winter term 2022  
CDX Engines textbook assignments

**\*\*TAKE CHAPTER Pre TESTS & TESTS\*\***

Unless otherwise stated

**Section and chapter content:**

<b>CST</b>	<b>HVE</b>		
<b>Section 1 F47257</b>	<b>ACD45B</b>	<b>Safety and fasteners Note:</b>	<b>Chapters 1-5</b>
<b>Section 2 A684BE</b>	<b>B3A47B</b>	<b>Diesel engine fundamentals</b>	<b>Chapters 6-8</b>
<b>Section 3 FC272F</b>	<b>7397A7</b>	<b>Engine construction and operation</b>	<b>Chapters 9-13</b>
<b>Section 4 9E3998</b>	<b>D369F8</b>	<b>Fuel systems</b>	<b>Chapters 14-27</b>
<b>Section 5 3423EF</b>	<b>323289</b>	<b>Induction</b>	<b>Chapters 28-35</b>

**Week 1: Jan 3-6 2022 AED 5.1 P55**

**READ** Chapters 1,6,7 in the text book and do all on line oportunities

**TAKE** Chapter 1 **pretest** (section #1)

**TAKE** Chapter 6 **pretest** (section #2)

**TAKE** Chapter 7 **pretest** ( section #2)

**DISCUSS** Be prepared to discuss chapter 1,6,7 by Thurs. Week 2

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**Week 2: Jan 10-13, 2022 (Monday) Martin Luther King Day no school) AED 5.3 P57**

**READ** Chapters 8,9,10 in the text book and do all on line oportunities

**TAKE** Chapter 8 Combustion systems **pretest** (section #2)

**TAKE** Chapter 9 Cylinder components **pretest** (section #3)

**TAKE** Chapter 10 Block and Cranks **pretest** (section #3)

**TAKE** chapter **test** chapter 1 **Section** (online)

**TAKE** chapter **test** chapter 6 **Section 2** (online) Diesel engine fundamentals

**TAKE** chapter **test** chapter 7 **Section 2** (online)

**DISCUSS** Be prepared to discuss chapter 08 by Tues and 9-10 by Monday

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**Week 3: Jan 17-20 2022 AED 5.3 P57**

**Monday no school Martin luther king day**

**READ** Chapters 11,12,13 in the text book and do all on line oportunities

**Engine construction (long block)**

**TAKE** Chapter 11 Cylinder heads **pretest** (section #3)

**TAKE** Chapter 12 Lubrication system **pretest** (section #3)

**TAKE** Chapter 13 Cooling system **pretest** (section #3)

**TAKE** chapter **test** chapter 8 **Section 2** (online)

**TAKE** chapter **test** chapter 9 **Section 3** (online)

**TAKE** chapter **test** chapter **10 Section 3** (online)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**DISCUSS** Be prepared to discuss chapter 11,12,13 by Thurs

**Week 4: Jan 24-27 2022 AED 5.3 P57**

**READ** Chapters 14-15-16 in the text book and do all on line oprtunities

**TAKE** Chapter 14 Diesel fuel **pretest** (section #4)

**TAKE** Chapter 15 Low Pressure Systems **pretest** (section #4)

**TAKE** Chapter 16 High Pressure systems **pretest** (section #4)

**TAKE** chapter **test** chapter **11 Section 3**(online)

**TAKE** chapter **test** chapter **12 Section 3** (online)

**TAKE** chapter **test** chapter **13 Section 3** (online)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**DISCUSS** Be prepared to discuss chapter 11-12 Wen

**Week 5: (Midterm) Jan 31 to Feb 3, 2022**

**AED 5.3 P57 AED5.7 p62, 63**

**READ** Chapters 17 18,19 in the text book and do all on line oprtunities

**TAKE** Chapter 17 Nozzles **pretest** (section #04)

**TAKE** Chapter 18 Governors **pretest** (section #04)

**TAKE** Chapter 19 Plunger pumps **pretest** (section #04)

**TAKE** chapter **test** chapter 14 **Section** (online)

**TAKE** chapter **test** chapter 15 **Section** (online)

**TAKE** chapter **test** chapter 16 **Section** (online)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**DISCUSS** Be prepared to discuss chapter 14-16 Wen

**Week 6: Feb 07-10 , 2022 AED5.7 p62, 63**

**READ** Chapter 20,28,29 in the text book and do all on line oportunities

**TAKE** Chapter 20 Rotary pumps **pretest** (section #04)

**TAKE** Chapter 28 Induction systems **pretest** (section #05)

**TAKE** Chapter 29 Turbo systems **pretest** (section #05)

**TAKE** chapter **test** chapter 17 **Section4** (online)

**TAKE** chapter **test** chapter 18 **Section4** (online)

**TAKE** chapter **test** chapter 19 **Section 4** (online)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**DISCUSS** Be prepared to discuss chapter 15 by Wen

**Week 7 Feb 14-16, 2022 AED5.7 p62, 63**

**READ** chapter 30,31,32 in the text book and do all on line oportunities

**TAKE** Chapter 30 V G Turbos **pretest** (section #05)  
**TAKE** Chapter 31 EGR **pretest** (section #05)  
**TAKE** Chapter 32 Charge air cooling **pretest** (section #05)

**TAKE** chapter **test** chapter 20 **Section 4** (online)

**TAKE** chapter **test** chapter 28 **Section 5** (online)

**TAKE** chapter **test** chapter 29 **Section 5** (online)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**DISCUSS** Be prepared to discuss chapter 17-18 by Wen

**Week 8 Feb 21-24 , 2022 (No school Monday Presidents day) AED5.7 p62, 63**

**READ** chapter ,3,5 8 in the text book and do all on line oportunities

**TAKE** Chapter 03 Pre **test** (section #01)

**TAKE** Chapter 05 Pre **test** (section #01)

**TAKE** Chapter 08 Pre **test** (section #02)

**DISCUSS** Be prepared to discuss chapter 19 by Wen

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**Week 9 Feb 28 - March 03, 2020 AED5.7 p62, 63 AED5.5 p60**

**Work on finishing Engines LAB Book**

**TAKE** Chapter 03 **test** (section #01)

**TAKE** Chapter 05 **test** (section #01)

**TAKE** Chapter 08 **test** (section #02)

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**Week 10 March 08-11, 2022 (Dead Week) Review for final exam**

**Work on finishing Engines LAB Book**

**Daily journal entry 4 per week for each student due on thursday with lab book.**

**Week 11 March 14-17 . 2022 (Finals week) March 20 last day of term**

