

ATL 220 Course Outline as of Fall 2024**CATALOG INFORMATION**

Dept and Nbr: ATL 220 Title: DIESEL FUEL SYSTEMS

Full Title: Diesel Fuel Systems

Last Reviewed: 12/4/2023

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	8	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50

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:

Catalog Description:

An in-depth study of heavy-duty diesel engine fuel and electronic control systems. Students will perform service, maintenance, and diagnosis of diesel engine fuel systems. Topics include Common Rail Fuel Injection, Heavy Duty Onboard Diagnostic (HD-OBD) emissions systems, and electronic signal processing and sensor technology. This course prepares students to pass the Automotive Service Excellence (ASE) T2 Diesel Engines or A9 Light Vehicle Diesel Engines certification tests.

Prerequisites/Corequisites:

Course Completion of ATL 110 and ATL 162

Recommended Preparation:

Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent

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

Description: An in-depth study of heavy-duty diesel engine fuel and electronic control systems. Students will perform service, maintenance, and diagnosis of diesel engine fuel systems. Topics include Common Rail Fuel Injection, Heavy Duty Onboard Diagnostic (HD-OBD) emissions

systems, and electronic signal processing and sensor technology. This course prepares students to pass the Automotive Service Excellence (ASE) T2 Diesel Engines or A9 Light Vehicle Diesel Engines certification tests. (Grade Only)

Prerequisites/Corequisites: Course Completion of ATL 110 and ATL 162

Recommended: Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent

Limits on Enrollment:

Transfer Credit:

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

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:

IGETC:	Transfer Area	Effective:	Inactive:
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CSU Transfer:	Effective:	Inactive:
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UC Transfer:	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. Identify the basic principles of the modern diesel engine.
2. Define the basic troubleshooting of diesel electronic fuel control systems.
3. Perform a visual inspection of diesel 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 actuated electronic unit injector systems
 - E. Common rail fuel systems
 - IV. Air Induction and Exhaust Systems
 - A. Air induction systems
 - B. Fixed geometry and wastegate 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 characteristics
 - C. Natural gas combustion systems
- All topics are covered in both the lecture and lab parts of the course.

Assignment:

Lecture-Related Assignments:

1. Weekly reading (25-75 pages)
2. Weekly chapter tests
3. Final exam

Lab-Related Assignments:

1. Engine fuel system related lab projects
2. ASE Education Foundation recommended task sheets
3. Daily work logs (work assigned, work completed) if assigned by instructor

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 - 20%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

ASE education foundation recommended task sheets

Problem solving
10 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Engine fuel system related lab projects

Skill Demonstrations
10 - 30%

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

Chapter tests; final exam

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. 2nd ed. Wright, Gus. Jones and Bartlett Learning. 2023

Instructor prepared materials