

## DISL 211-HRNS-DIESEL FUEL SYSTEMS 4 CREDITS

### SYLLABUS

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#### CATALOG DESCRIPTION

Theory and operation of various fuel supply and high pressure injection systems on diesel powered equipment. Systems and component covered include hydro-mechanical and electronic PLN, EUI, hydro-mechanical and electronic injector nozzles, Common Rail, and Amplified Common Rail. Safety will be strictly enforced. A Grade of "C" or better must be earned to receive credit for this course.

Prerequisites: DISL 110 and DISL 115

Semester Offered: Fall

#### ***Common Student Learning Outcomes***

*Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...*

##### **BROAD AND SPECIALIZED LEARNING**

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

##### **CRITICAL THINKING**

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

##### **CULTURAL AND CIVIC ENGAGEMENT**

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

##### **EFFECTIVE COMMUNICATION**

Students will exchange ideas and information with clarity in multiple contexts.

##### **INFORMATION LITERACY**

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

##### **INTEGRATING TECHNOLOGIES**

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

*Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.*

#### **Course Learning Outcomes**

1. Explain diesel fuel, its advantages, disadvantages, and history.
2. Enable the student to correctly identify and explain the operation of various diesel fuel injection systems to identify the correct diagnostic procedures to repair a malfunctioning diesel fuel system.

## Specific Learning Objectives:

Upon successful completion of the course, the student will be able to...

1. Identify the qualities of various fuel oils including diesel fuel.
2. Demonstrate the ability to successfully assess the quality of a sample of diesel fuel.
3. Check fuel level, contamination and consumption; determine needed repairs.
4. Check fuel system for air; determine needed repairs.
5. Prime and bleed fuel system; check, repair/replace priming pump.
6. Test fuel supply pressure; determine needed repairs.
7. Test fuel filter differential pressure; determine needed repairs.
8. Inspect TPS sensors and wiring; determine needed repairs.
9. Diagnose cause of engine fuel leaks; determine needed repairs.
10. Perform on-engine inspections, remove, test, and adjust injectors (nozzle); determine needed repairs.
11. Explain the operation of inline and rotary PLN, UI, EUI, HEUI, and common rail injection systems.
12. Diagnose failures of inline and rotary PLN, UI, EUI, and common rail injection systems.
13. Check and adjust fuel injection pump to engine timing in PLN injection systems.
14. Remove and install unit injectors and injector nozzles.
15. Inspect air/fuel ratio controls; determine needed repairs.
16. Explain operation of diesel engine governing systems including LS, VS, and isochrones in both mechanical and electronic applications.
17. Inspect and test injection nozzles for functionality and wear.
18. Perform low pressure system common rail fuel tests and determine needed repairs.
19. Perform high pressure system common rail fuel tests and determine needed repairs.
20. Inspect, test, and adjust engine fuel shutdown controls; determine needed repairs.
21. Research alternative fuels that can be used in diesel engines.
22. Research alternative prime movers as replacements for diesel engines.
23. Author a presentation on the logistics, manufacturing, advantages, disadvantages, etc. of alternative fuels or prime movers for diesel engine applications.
24. Present a presentation on alternative fuels and prime movers for diesel engines to a peer group (class).