

EN 345
Elementary - 3rd Class Power Engineering Lab
4 Credits

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EN 345 Version: 2



Elementary - 3rd Class Power Engineering Lab

Calendar Description

Students are guided running labs -- 13 (65 hours) in a safe efficient manner. Labs include water treatment, running the low pressure boiler, an O and D type water tube boilers, boiler feed water systems and lab utilities. P/F.

Rationale

Students must have 200 hours of 3rd class lab (plus pass the 4 ABSA exams and a 3 month practicum) in order to be eligible for their 3rd class steam certificate. In this course EN345, students get 65 hours of those 200 hours in a controlled lab setting. Once students complete EN345 students need EN346 to obtain the remaining 135 hours. ABSA has defined requirements that these two courses demonstrate in order for students to be able to operate pressure vessels in a safe manner. Students must also possess a 4th class steam certificate at the start of this class.

Prerequisites

Students must have a 4th class ABSA steam ticket

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to (3rd class boiler competencies)

1. demonstrate safety of lab, use MSDS and create an emergency response plan
2. review and demonstrate external and internal water treatment and perform various water tests
3. demonstrate and perform line tracing and general knowledge of starting and stopping the Low pressure boiler.
4. test boiler interlocks and troubleshooting of LP Boiler.
5. identify and demonstrate general knowledge of plant Utilities.

6. trace and perform start-up of High Pressure (HP) D-Water Tube Boiler. Demonstrate knowledge of boiler control systems. Demonstrate how to Cut in and Cut out a boiler into the header.
7. operate the operational protection system with their components and perform routine checks and maintenance on D Water Tube Boiler.
8. demonstrate various steam Traps and give an explanation on how they work and in which situation they would be used. Students also perform routine maintenance and operational checks of lab steam traps.
9. operate the O WTB. Students identify various components of the steam driven boiler feedwater pump and demonstrate how to operate it.
10. demonstrate knowledge of lab electrical distribution system.
11. identify and operate condensing economizer.
12. prepare a steam driven turbine for starting up. Students demonstrate operational limits of return line condensate system and how it relates to the steam driven turbine.
13. demonstrate steam driven turbine auxiliary systems
14. execute, as a part of a team/crew/shift/class, the proper cold start up procedure for a boiler.

Resource Materials

Students must purchase EN 345 and EN 346 3rd Class Lab Manual from the Lakeland College Bookstore. The Lab Manual contains all labs and assignments.

Conduct of Course

Student perform in the Cenovus Lab:

- group/team work
- hands on controls
- water testing
- drawing and sketching
- use of tools

Evaluation Procedures

This course is pass/fail based on:

1. Attendance, all students must complete the 65 hours, failure to miss a lab is up to the student to redo the lab missed
2. Demonstration of competencies by two methods
 - oral exam walk through with instructor
 - achieve a 65% in a final exam

Grade Equivalents and Course Pass Requirements

This is a pass/fail course, so the mark recorded on the transcript is "P" for pass for "F" for fail.

Attendance

100% attendance is mandatory for all 65 hours of the 13 Labs -- failure to do so results in an incomplete or fail.

Course Units/Topics

- Lab 1 – Cenovus Lab
 - Introduction to Labs
 - Safety
- Lab 2 – Cenovus Lab
 - External Water Treatment
 - BFW supply (LP & HP)
- Lab 3 – Cenovus Lab
 - LP Boiler & LP Steam System
 - Water Tests
- Lab 4 – Cenovus Lab
 - LP Boiler - Trouble-shooting
 - Water Tests
- Lab 5 – Cenovus Lab
 - Air Compression
 - SOP & Piping
 - Pressure Dew Point
 - Competency Checks (1 – 4)
- Lab 6 – Cenovus Lab
 - HP Steam System
 - Competency Checks (1 – 4)
- Lab 7 – Cenovus Lab
 - D-WTB
 - Charging HP header

- Lab 8 – Cenovus Lab
 - O-WTB
 - Steam Traps
- Lab 9 – Cenovus Lab
 - BFW turbine pump
- Lab 10 – Cenovus Lab
 - Competency Checks (5 – 9)
 - Condensing Economizer
- Lab 11 – Cenovus Lab
 - Competency Checks (5 – 9)
 - Electrical Distribution System
- Lab 12 – Cenovus Lab
 - Power Turbine
- Lab 13 – Cenovus Lab
 - Written test for end of EN 345
 - Auto Synch



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