## PELM 3300, Steam Generation

4 Credits, 6 months

## Course Description

Topics covered are boilers, boiler control systems, heating and air conditioning, feedwater treatment, pumps, and welding as identified in the Alberta Boilers Safety Association Reference Syllabus for the first paper of 3rd Class Part B Power Engineering.

## Pre and Co-requisites

ABSA Fourth Class Power Engineering Certificate

## Course Learning Outcomes (CLOs)

*Upon successful completion of the course, the student shall be able to:*

CLO1 Describe common designs, configurations and circulation patterns for modern bent-tube watertube boilers and steam generators and explain how boilers are rated.
CLO2 Describe the designs, components, firing methods, and operating considerations for some special boilers used in industry.
CLO3 Explain Code requirements, in general terms, and describe construction and assembly methods for the major components of a large boiler.
CLO4 Explain the purpose, location, design and operating conditions for the major heat transfer components of a large watertube boiler or steam generator.
CLO5 Describe the design and operation of common external and internal fittings attached to the pressure side of a high-pressure boiler.
CLO6 Describe the typical components of fuel supply systems and describe common burner/furnace designs for gas, oil, and coal-fired boilers.
CLO7 Explain boiler draft systems and fans and describe the equipment used to remove ash from flue gas.
CLO8 Explain the components and operation of automatic control systems for boiler water level, combustion, steam temperature, and start-up.
CLO9 Describe common procedures in the operation and maintenance of high pressure boilers.
CLO10 Define properties of saturated and superheated steam and, using information from the steam tables, calculate the heat required to produce steam at various conditions; determine the evaporation in steam boilers.
CLO11 Explain the purpose, principles, equipment, and monitoring of boiler water pretreatment processes.
CLO12 Describe the designs, principles, components, and operating procedures for common industrial pumps.
CLO13 Explain proper priming and start-up procedures and considerations for pumps.

CLO14 Explain the processes and applications of different welding techniques and describe the testing of welds and procedures.
CLO15 Explain pressure vessel design, stresses, and operating considerations.

## Evaluation

| Assessment Type | Percentage |
|---|---|
| Chapter and Unit Quizzes | 15% |
| Section Test 1 | 10% |
| Section Test 2 | 10% |
| E3 – Final Exam | 65% |
| | |

## Course Completion Requirements

Minimum passing mark of 65% or C is required.

## Grading Scale

| 4.0 Grade Scale | Alpha Grade | Percentage Grade |
|---|---|---|
| 4.0 | A+ | 93-100 |
| 4.0 | A | 85-92.9 |
| 3.7 | A- | 80-84.9 |
| 3.3 | B+ | 77-79.9 |
| 3.0 | B | 74-76.9 |
| 2.7 | B- | 70-73.9 |
| 2.3 | C+ | 67-69.9 |
| 2.0 | C | 64-66.9 |
| 1.7 | C- | 60-63.9 |
| 1.3 | D+ | 55-59.9 |
| 1.0 | *D | 50-54.9 |
| 0.0 | F | 0-49.9 |

## Land Acknowledgement

We respectfully acknowledge that Keyano College is on Treaty No. 8 Territory, the ancestral and traditional territory of the Cree, Dene, and Métis people.

Review Date: March 4, 2024