EN448

Codes & Administration

5 Credits

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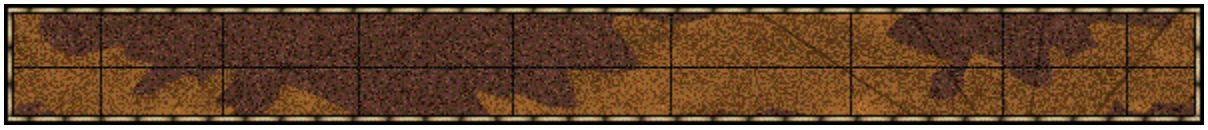

Codes & Administration

Calendar Description

The codes section deals with ASME section I & VII calculations which include cylindrical heads, openings, stayed surface, pressure relief valves and fire tube boiler. The administration part includes legislation, acts and regulations governing the installations, modifications and operations of a power plant. Many aspects of managing a power plant, such as personnel, planning, maintenance, inspection, budgeting, and safety programs are discussed.

Rationale

This course has been developed to fill the gap of Second Class Power Engineers created by the retiring generation of power engineers.

Industry has shifted their focus from employing the lower levels of certification of power engineers to the higher levels of certification.

Upon successful completion of this program the student is eligible for a 9 month reduction in qualifying time experience granted by ABSA.

The six parts of the program are divided into 15 courses where the student has the option of registering for individual courses, Part A, Part B, or both Part A and Part B.

Prerequisites

EN310, EN320, EN410, EN420, or Third Class Power Engineer's Certificate of Competency.

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. calculate the required minimum thickness or the maximum allowable pressure of piping, tubes, drums, and headers of ferrous tubing up to and including 127 mm O.D.

2. calculate the required thickness or maximum allowable working pressure of ferrous piping, drums and headers.
3. calculate the required thickness or maximum allowable working pressure of a seamless, unstayed dished head.
4. calculate the minimum thickness or maximum allowable working pressure of unstayed flat heads, covers, and blind flanges.
5. calculate the acceptability of openings in a cylindrical shell, header, or head.
6. calculate the compensation required to reinforce an opening in a cylindrical shell, header, or head.
7. calculate the required thickness and design pressure for braced and stayed surfaces in pressure vessels and the minimum required cross-sectional area of a stay.
8. calculate the ligament efficiency method for two or more openings in the pressure boundary of a pressure vessel.
9. calculate the required size and capacity of safety valves and safety relief valves.
10. calculate required wall thicknesses of plain circular furnaces, circular flues, and corrugated furnaces.
11. identify the types and sources of laws and the levels and scope of the courts.
12. define statutory delegation of powers as they apply to the Boilers and Pressure Vessels Act.
13. describe the authority that safety officers (inspectors) have within their jurisdiction.
14. determine what are the offences and penalties under the Act and the appeal process.
15. describe the typical regulations under the Boilers and Pressure Vessels Act.
16. describe the typical codes and standards referenced by the Boilers and Pressure Vessel Act.
17. state the codes and standards, which must be followed when designing and building a new plant.
18. describe the steps involved in developing specifications and contracts for new installations and modifications.
19. explain the major steps involved in the design and construction of a new plant.
20. explain the roles and responsibilities in the design and construction of a new plant
21. explain how the design and construction of a new plant are administered and controlled.
22. define management and explain the general functions of management.
23. explain how management goals and objectives are developed through planning.
24. describe how business decisions are made.
25. describe methods of selecting new employees.
26. explain how employees are trained.
27. explain how to provide leadership and motivate employees.
28. explain how to manage employee performance and behaviours.
29. determine proper communication skills by writing a formal report.
30. describe the major aspects of managing maintenance activities including management of maintenance, maintenance program development, planning, scheduling, performing maintenance, assessment and improvement.
31. describe the different approaches to maintenance including preventive, and corrective.
32. describe how routine maintenance activities are planned, scheduled, and controlled.
33. describe the use of Gnatt and PERT charts and the critical path method to schedule major maintenance activities.

34. describe the steps involved in preparing for, and conducting, a pressure vessel inspection.
35. describe the use of computerized systems in managing maintenance, including a work order system.
36. describe various methods of monitoring equipment, including log sheets and trending.
37. describe the steps involved in developing a plant budget and controlling maintenance costs.
38. describe the elements of a comprehensive safety program for a power plant.
39. explain the purpose of and the process used for safety checklists, inspections, audits and reviews.
40. explain the purpose of and the process used for safety orientation, education, and training.

Resource Materials

***Required Text*:**
Power Engineering Second Class (2015) A-1 Code Calculations and Legislation (2nd ed.).

Calgary, AB: PanGlobal Training Systems Ltd.

2007 ASME Extract and Supplement

NOTE: Additional resource material is provided or accessed through D2L

Conduct of Course

This course is delivered face to face and includes class lectures, group discussions, demonstrations, assignments and projects.

Cutaway models and actual equipment may be used to support instruction and demonstrations.

Where applicable video clips may be used to support instruction and demonstrations.

D2L is used as a support educational resource.

This course consists of seven chapters. There is an exam at the end of each chapter as well as a midterm and final exam.

The exams consist of seven written questions of which the student chooses five questions to answer.

Evaluation Procedures

Lakeland College is committed to the highest academic standards. Students are expected to be familiar with Lakeland College policies related to academic conduct and academic honesty and to abide by these policies.

The marking scheme for this course is:

Assignments and Projects	30%
Unit Tests (Quizzes)	40%
Final Exam	30%
Total	100%

The contents and dates of the chapter exams are determined in class.

All questions are long answer written types of questions.

A minimum grade of 65% is required to pass this course.

The final exam for this course is part of a combined 2A1 Final Exam for the semester.

A GRADE OF AT LEAST 60% IS REQUIRED ON THE FINAL EXAM TO PASS THIS COURSE.

Those students seeking a qualifying time reduction must achieve a grade of 65% for sections A-1, A-2. A-3. B-1, B-2, B-3.

Students receive a certificate from Lakeland College indicating successful completion of the program.

NOTE:

This program consists of six components; each component corresponds to one examination paper of the Alberta Boilers Association (ABSA) examination process.

The requirements for a second class power engineer consist of six ABSA examinations and 30 months of qualifying industry experience.

Grade Equivalents and Course Pass Requirements

A minimum grade of C+ (65%) is required to pass this course.

Letter	F	C+	B-	B	B+	A-	A	A+
Percent Range	0-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Attendance

For those students seeking the nine month experience qualifying time reduction granted by ABSA refer to the Student Handbook. (80% attendance of the total of the two semesters).

For the remaining students there is no mandatory attendance requirement.

Course Units/Topics

ASME Code Calculations: Cylindrical Components

(Apply the appropriate formulae from ASME Sections I and VIII to calculations involving cylindrical components, openings, and compensations in boilers and pressure vessels)

ASME Code Calculations: Stayed Surfaces, Safety Valves, Furnaces

(Apply the appropriate formulae from ASME Sections I, IV, and VIII to calculations involving pressure vessel stayed surfaces, ligament efficiency, safety and safety relief valves, and furnaces)

Boiler and Pressure Vessel Legislation

(Describe the components and applications of boiler and pressure vessel legislation that are common within Canadian jurisdictions)

Plant Design and Installation

(Explain the codes and procedures involved in the design and construction of a new plant)

Management and Supervision

(Describe plant maintenance management systems)

Plant Maintenance

(Describe plant maintenance management systems)

Safety

(Explain the components and application of safety programs, safety audits, and safety training)

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