

EN 129

4th Class Power Engineering Part B Online

10 Credits

Instructor: Reg Lee

Original Developer: Ron Smith

Current Developer: Reg Lee

Reviewer: Robert Collins

Created: 22/02/2000

Revised: 10/02/2021

Approval: 10/06/2021

The Implementation Date for this Outline is 31/08/2021

Copyright©LAKELAND COLLEGE. Email: admissions@lakelandcollege.ca
2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400
Toll-free in Canada: 1 800 661 6490



EN 129 Version: 14



4th Class Power Engineering Part B Online

Calendar Description

This is an instructor-paced online course study, Part B, of the Pan Global 4th Class Power Engineering material leading to provincial certification. The SOPEEC curriculum, which is used by all provincial power engineering regulatory bodies, has been used as a benchmark for the development of this course.

Rationale

This course is of particular interest to students presently employed as field operators. Candidates who are considering a career in Power Engineering must successfully complete an approved course by the Alberta Boiler Safety Authority (ABSA) or Technical Safety Association of Saskatchewan (TSASK). By successfully completing both this course and EN 128 (Part A) the student is provided with the theoretical knowledge necessary to challenge the provincial government Fourth Class Power Engineer's Certificate of Competency examination. In order for a student to be accepted by government to write the necessary provincial examination they must first have completed a TOTAL of 6 months as a practicum student with industry or have completed EN 131 or completed QTRA 231.

Prerequisites

At present there are no prerequisites. However, it is strongly recommended the potential students have a good understanding of both math and physics

Co-Requisites

None

Course Learning Outcomes

Depending upon which province the student is located, upon successful completion of this course, the student will be able to:

1. apply to write their provincial government examination for the Part B 4th Class Power Engineering examination because they will be eligible; or

- challenge Part A and B provincial government examinations if EN 128 (Part A) and EN 129 (Part B) are complete with Lakeland College-- once completed the Part A course the student receives a completion letter to submit to the appropriate government regulatory body to challenge the government Part A exam. Once completed the Part B course the student receives a completion letter to submit to the appropriate government regulatory body to challenge the government Part B exam. Once both exams are completed successfully, and 6 months of steam time is approved by the regulatory body or a 200-hour approved steam lab (QTRA 231) a 4th class power engineering certificate is issued.

Resource Materials

Required Resources:

Power Engineering - The Industry Standard Fourth Class Part B Textbook Set, Units 1 through 12; Edition 3.0/3.5.; *PanGlobal Training Systems Ltd Publication 2017* or newer.

PanGlobal Academic Supplement 2.0 – Steam Tables, Refrigeration Tables and Handbook of Formulae and Constants; 2012 Edition or newer.

PanGlobal ASME Academic Extract Boiler & Pressure Vessel Code Volume 1; 2018 Edition or newer.

PanGlobal Extract of CSA Standards B51 and B52.

Provincial Boiler & Pressure Vessel Acts and Regulations (for your specific province)

Optional Resource:

PanGlobal 4th Class Workbook - Part B; Publication 2017

Required Materials:

Scientific calculator

Conduct of Course

This is a blended learning environment. The basis of study is from the PanGlobal materials, supplemented with several learning videos embedded within the course content and continued facilitator input and support.

To successfully complete all aspects of the course, the student is expected to follow the suggested timeline for reading assignments and section exams. To complete the theoretical and practical knowledge necessary to obtain their Fourth-Class Power Engineer's Certificate of Competency, the student must also complete:

EN 128 (Part A)

QTRA 231 (Steam Lab) Or equivalent within Industry or with another approved school/college.

Evaluation Procedures

The final grade is determined by five (5) section exams and a final examination.

Section Exams..... 50%

Final Examination.....50%

Grades

A minimum grade of C+ (65%) (1.00) 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	4.0

Attendance

Weekly reading assignments are suggested in the Recommended Time Frame/Schedule. The student is expected to use it as a guideline to successfully complete the course work. Section exams will remain available to the student for the allocated four (4) month period

Course Units/Topics

Part B

Unit B1 Lubrication and Bearings

Chapter 1: Lubrication Principles

Chapter 2: Types of Bearings and Lubrication

Unit B2 Pumps & Compressors

Chapter 1: Types of Pumps

Chapter 2: Pump Operation & Maintenance

Chapter 3: Introduction to Compressors

Chapter 4: Compressor Operation and Maintenance

Unit B3 Boiler Safety Devices

Chapter 1: Pressure Relief Valves

Chapter 2: Combustion Safety

Chapter 3: Water Level Safety Controls

Chapter 4: Boiler Fittings

Chapter 5: Firing Rate Controls

Unit B4 Boiler Plant Operation and Management

Chapter 1: Boiler Plant Startup

Chapter 2: Boiler Startup

Chapter 3: Boiler Operation

Chapter 4: Operational Checks

Chapter 5: Shutdown Procedures

Chapter 6: Boiler Plant Monitoring and Reporting

Unit B5 Energy Plant Maintenance

Chapter 1: Energy Plant Maintenance 1

Chapter 2: Energy Plant Maintenance 2

Chapter 3: Boiler Maintenance

Chapter 4: Boiler Cleaning

Unit B6 Water Treatment

Chapter 1: External Boiler Water Treatment

Chapter 2: Internal Boiler Water Treatment

Chapter 3: Condensate Treatment

Chapter 4: Cooling Tower and Condenser Water Treatment

Chapter 5: Recirculating System Water Treatment

Unit B7 Types of Prime Movers and Heat Engines

Chapter 1: Heat Engines and Prime Movers

Chapter 2: Steam Turbines

Chapter 3: Condensers and Cooling Towers

Chapter 4: Gas Turbines

Chapter 5: Internal Combustion Engines

Unit B8 Heating Boiler & Heating System Controls

Chapter 1: Lighting Systems

Chapter 2: Building Water Systems

Chapter 3: Drainage Systems

Unit B9 Basic Concepts of Compression and Absorption Refrigeration

Chapter 1: Refrigeration Basics

Chapter 2: Compression Refrigeration Systems

Chapter 3: Refrigeration System Control and Operation

Chapter 4: Refrigeration System Operation and Maintenance

Chapter 5: Absorption Refrigeration Systems

Chapter 6: Refrigeration Plant Safety

Unit B10 HVAC Fundamentals for Facility Operators

Chapter 1: Conditioning the Air

Chapter 2: Humidification

Chapter 3: Fans for Air Distribution Systems

Chapter 4: Ventilation and Air Filters

Chapter 5: HVAC Duct Systems

Chapter 6: Types of Coils and Operation

Unit B11 Building Environmental Systems and Control

Chapter 1: Steam Heating

Chapter 2: Hot Water Heating

Chapter 3: Other Heating Systems

Chapter 4: Cooling Systems and Combination Systems

Chapter 5: Heat Gains and Losses, and Heat Recovery Methods

Chapter 6: HVAC Control Strategy

Unit B12 Typical Industrial Plant Configurations

Chapter 1: Common Plant Configurations in Hydrocarbon Centric Industries

Chapter 2: Common Plant Configurations in Energy Intensive Industries



Copyright©LAKELAND COLLEGE.
2602 - 59 Avenue, Lloydminster, Alberta, Canada T9V 3N7. Ph: 780 871 5700
5707 College Drive, Vermilion, Alberta, Canada T9X 1K5. Ph: 780 853 8400
Toll-free in Canada: 1 800 661 6490 E-mail: admissions@lakelandcollege.ca