EN110

4th Class Power Engineering Part A-1

5 Credits

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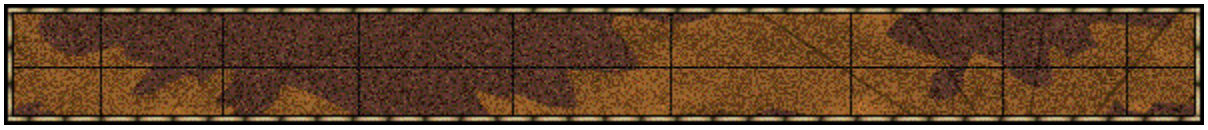
Created: 25/08/2009
Revised: 10/08/2020
Approval: 11/08/2020
Alternate Delivery: No

The Implementation Date for this Outline is 12/08/2020

EN110 Version: 7



4th Class Power Engineering Part A-1

Calendar Description

EN 110 follows the current SOPEEC syllabus and curriculum to prepare a student to take the "A" portion of the 4th Class Power engineer's Certificate of Competency examination.

This course covers the following subject material: elementary mechanics and dynamics, codes & standards, environment, piping & valves, basic plant instrumentation and boiler operation.

Rationale

This is a required course for Heavy Oil Operations Technician and Heavy Oil Power Engineering students. It prepares the students with the specific skills and knowledge necessary to challenge the ABSA Provincial 4th Class Power Engineering examination. It provides the students with the theory and hands-on training necessary to operate heating and power boilers safely and efficiently.

Prerequisites

General Sciences (Grade 10 Physics, Chemistry, and Math preferred)

Co-Requisites

EN138

Course Learning Outcomes

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

1. apply basic terms and calculations used in the study of mechanics.
2. perform calculations involving forces and moments, and determine when a system of forces is in equilibrium.
3. perform calculations relating to mechanical advantage, velocity ratio and efficiency.
4. define and identify scalar and vector quantities and solve simple vector problems graphically.
5. solve simple problems involving linear velocity, time, and distance.
6. perform calculations involving force, work, pressure, power, and energy.

7. solve problems involving friction.
8. explain physical properties of materials and how their behaviour is affected when external forces are applied.
9. perform calculations pertaining to common power transmission systems.
10. describe the Power Engineer profession.
11. describe the application of Jurisdictional Acts and Regulations with respect to boilers and pressure vessels.
12. describe the purpose of boiler and pressure vessel Codes and Standards.
13. identify environmental considerations and how they relate to an operating plant.
14. explain how gas and noise emissions affect plant operations.
15. explain how liquid and solid emissions affect plant operation.
16. discuss the basic types of piping, piping connections, supports, and drainage devices used in industry.
17. discuss the design and uses of the valve designs most commonly used in industry and on boilers.
18. describe the overall purpose and function of plant instrumentation systems.
19. describe the construction and operation of common devices used to measure pressure, level, flow, temperature, humidity, and composition.
20. explain the basic types and functions of transmitters, recorders, controllers, and control actuators.
21. describe the operation of programming controls for boilers, including applicable testing and maintenance procedures.
22. describe the design and operation of electronic control systems.
23. describe the design and operation of electrical control systems.
24. discuss the basic theory of combustion, and the equipment used to provide proper combustion conditions within a boiler.
25. describe common fuel systems found in boiler systems.
26. describe basic concepts and equipment used to supply combustion air to boiler furnaces.
27. describe feedwater systems used with boilers.
28. explain the equipment, operation, and purpose of boiler blowoff and blowdown systems.
29. summarize the different types of boiler fireside cleaning equipment, their purpose, and their operation.

Resource Materials

***Required Textbooks*:**

Power Engineering Fourth Class Edition 3 PanGlobal Training Systems Ltd.

Power Engineering Academic Supplement 2.0 (2017) PanGlobal Training Systems Ltd.

2018 ASME Academic Extract Boiler and Pressure Vessel Code Volume1 PanGlobal Training Systems Ltd.

2018 ASME Academic Extract Boiler and Pressure Vessel Code Volume 2 PanGlobal Training Systems Ltd.

Extract of CSA Standards B51-09, B52-05 and B52S1-09 PanGlobal Training Systems Ltd.

Province of Alberta SAFETY CODES ACT "Power Engineers Regulation"

Province of Alberta SAFETY CODES ACT "Pressure welders Regulations"

Province of Alberta SAFETY CODES ACT "Pressure Equipment Safety Regulation"

Province of Alberta SAFETY CODES ACT "Pressure Equipment Exemption Order"

Province of Alberta SAFETY CODES ACT "Revised Statutes of Alberta 2000 Chapter S-1"

***Required Equipment*:**

- Drawing Instruments
- Pencils
- Erasers
- Non-technical English language dictionary

Non programmable ABSA approved calculator from the following list:

Calculators beginning with the following will be permitted.			
CASIO	SHARP	Abacus	SX-11 Matrix…
fx-82…	EL-350…	Canon	F715…
fx-83…	EL-506…	Canon	F717…
fx-85…	EL-509…	Canon	F720…
fx-92…	EL-510…	Cebar	CD-402
fx-95…	EL-520…	Citizen	SR-135…
fx-96…	EL-531…	Citizen	SR-260…
fx-100…	EL-533…	Citizen	SR-270…
fx-115…	EL-546…	HP	HP 8S…
fx-122…	EL-W516…	HP	HP 9S…
fx-220…	EL-W531…	HP	HP 10S…
fx-260…	EL-W532…	HP	HP 300…
fx-270…	EL-W535…	Insystem	IN-82SC…
fx-300…		Jastek	JasCS1…
fx-350…		Kenko	KK 82-TL…
fx-550…		Kenko	KK 87-MS…
fx-570…		Kenko	KK 350-TL…
fx-580…		KLT	FG-82BL…
fx-820…		Office One	720…
fx-901…		Office One	3000…
fx-911…		RadioShack	EC-4032…
fx-991…		RSB	FB 350…

fx-992…		Scholar	DS-82MS
HL4…		Scholar	KD-350MS…
		Tandy	EC-4032…
		Texas Instruments	TI-30…
			TI-34…
			TI-36…
			TI-40…
		Texnet	Albert2,3,5…
		Texnet	fx1000…
		UBT	FA-83W…

Conduct of Course

This course is delivered by classroom instruction using the material from the latest PanGlobal training systems Ltd. The course covers the topics outlined in the latest SOPEEC syllabus which is in line with Alberta Boiler Safety Association (ABSA). Additional reference materials are used to supplement the core material.

The course along with EN114 is 218 hours in length and consists of lectures, assignments, tests, and a midterm and finale exam. The assignments are composed of handouts, workbook or D2L platform or a combination of these.

Evaluation Procedures

D2L Quiz	11%
Knowledge Exercises	12%
1st Quarter Test	13%
2nd Quarter Test	13%
3rd Quarter Test	13%
4th Quarter Test	13%
Final	25%

65% is the overall required course mark and a minimum of 50% on the final exam.

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

65% is the overall required course mark to pass this course and a minimum of 50% on the final exam.

Attendance

The Hoot and HOPE programs are approved courses by ABSA, and as such require our students to attend class. Section 4.A. The "School of Energy Hoot & Hope Student Handbook" provides the attendance details for this course.

Course Units/Topics

Unit 1A Elementary Mechanics and Dynamics

Introduction to Basic Mechanics

Forces and Moments

Simple Machines

Scalars and Vectors

Linear Velocity

Force, Work, Pressure, power, and Energy

Friction

Stress and Strain

Power Transmission

Unit 3A. Introduction to Power Engineering and Its Governance In Canada

Introduction to Power engineering

Jurisdictional Legislation for Power Engineers

Codes and Standards for Power Engineers and Pressure Vessels

Unit 5A. Introduction to Plant Operations and the Environment

Introduction to Environment

Gas and Noise Emissions

Liquid and Solid Emissions

Unit 7A. Introductory Fluid Handling Technology

Introduction to Energy Plant Piping Systems

Introduction to Energy Plant Valves

Unit 9A. Energy Plant Instrumentation and Controls

Introduction to Energy Plant Controls & Instrumentation

Introduction to Process Measurement

Basic Controls & Instrumentation Components

Introduction to Programmable Controllers

Electronic Control Systems & Computer Applications

Electrical Control Systems

Unit 12A. Elements of Boiler Systems

Combustion

Fuel Delivery & Firing systems

Draft

Feedwater Systems

Blowoff and Blowdown Systems

Boiler Fireside Cleaning Systems

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