

## 4<sup>th</sup> Class Power Engineering Coop

2020 Winter PECO 4100 A

### **PECO 4100 Plant Services**

*4 credits, 4 weeks, 120 hours*

Areas covered are elementary mechanics and dynamics, elementary physical, chemical, and thermodynamic principles, legislation, codes, and standards, plant and fire safety, plant operations and the environment, material science and welding technology, and introductory fluid handling technology as identified in the Alberta Boilers Safety Association Reference Syllabus for 4th Class Part A Power Engineering.

### **Instructors**

Brian MacDougall  
Program Chair  
780-792- 5635  
[Brian.MacDougall@keyano.ca](mailto:Brian.MacDougall@keyano.ca)

Alan Block  
780-791-4895  
[Alan.Block@keyano.ca](mailto:Alan.Block@keyano.ca)

Rifat Dyrmishi  
780-792-2681  
[Rifat.Dyrmishi@keyano.ca](mailto:Rifat.Dyrmishi@keyano.ca)

Robert Marsh  
780-792-5130  
[Robert.Marsh@keyano.ca](mailto:Robert.Marsh@keyano.ca)

Rahul Ponde  
780-792- 5126  
[Rahul.Ponde@keyano.ca](mailto:Rahul.Ponde@keyano.ca)

Lorn Wionzek  
780-792-5113  
[Lorn.Wionzek@keyano.ca](mailto:Lorn.Wionzek@keyano.ca)

## Office hours

As per request from students, instructors are available outside of instructional hours. Please arrange a time with your instructor.

## Required Resources:

Power Engineering Fourth Class (Textbook), Part A PanGlobal, Edition 3.0, ISBN 978-1-77251-071-3

Academic Supplement, PanGlobal, Edition 2.0, ISBN 978-1-77251-073-7

2018 ASME Boiler & Pressure Vessel Code Volume 1, Academic Abstract 2018 Edition, ISBN 978-1-77251-108-6

## Recommended Resources:

Power Engineering Fourth Class (Textbook), Preparatory Topics for Power Engineers, PanGlobal, ISBN 978-1-77251-074-4

## Course Outcomes

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

- Apply basic physics principles to solve Power Engineering related calculations.
- Describe the principles of thermodynamics of steam and heat transfer.
- Describe and apply industrial codes and provincial legislation relating to Power Engineers and pressure vessels.
- Identify and describe safe work practices and safety programs in place in industrial settings.
- Recognize and apply plant fire safety programs and equipment.
- Explain the effects of operating plants on the environment and discuss methods of prevention and control.
- Describe mechanical properties of engineering materials, welding processes, and inspection and testing methods used in relation to the Power Engineering field.
- Discuss and identify basic types of piping, valves, and fittings most commonly used in industry.

## Evaluation

Students will be graded using percentage scales.

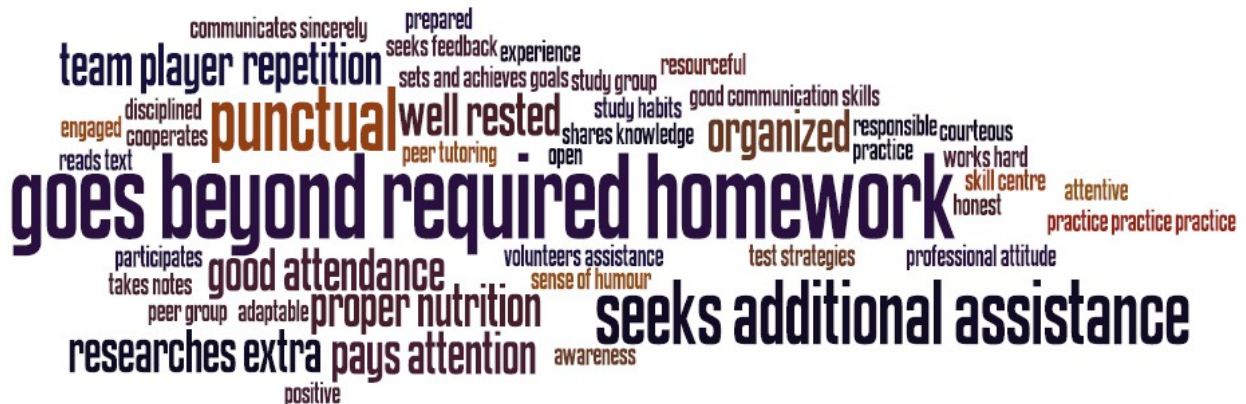
Category	Weight
Section “S” Test	20%
Section “S” Test	20%
“E” Exams	40%
Moodle Chapter & Unit	20%
<b>Total Grade</b>	<b>100%</b>

*The minimum standard for passing all “S” & “E” exams and the overall course is a grade of 65%. In addition, a **PASS** mark for completion of six month work experience co-op is required.*

## Performance Requirements

Technical training is considered an extension of the workplace in terms of attendance and punctuality. It is expected that students will manage their time in accordance with the published program schedule and will attend all classes.

## Behaviours of a Successful Student



**SKILL Centre Information:**

The SKILL Centre is a learning space in the Clearwater Campus where students can gather to share ideas, collaborate on projects and get new perspectives on learning from tutorial staff. A student conference room is available for students to “reserve” for student group purposes. The SKILL Centre is for support and reinforcement of course concepts. Hours of operation are Monday – Friday 8:30am - 4:30pm. Additional evening and weekend tutorial hours will be posted in the Skill Centre or please contact [skill@keyano.ca](mailto:skill@keyano.ca) to confirm tutoring availability.

**Keyano College Student Rights and Code of Conduct:**

It is the student’s responsibility to familiarize themselves with the Student Rights and Responsibility Policy found in the Keyano College Credit Calendar 2019-2020, pages 40-43. The information contained in this policy should guide the student’s conduct while attending Keyano College.

**Teaching & Learning Methodologies**

This course is delivered in a classroom setting, supplemented by online testing through iLearn/Moodle; <http://ilearn.keyano.ca>

- iLearn/Moodle will be used for ongoing assessment purposes. Please be patient and bring questions/concerns regarding the test bank to your instructor.
- All quizzes and exams on iLearn will open in a SECURE window. Any attempts to breach security measures (i.e. copy, print, screen capture, right clicking, navigation away from quiz/exam window, etc.) will automatically eject you out of the quiz. Occurrences of this nature will be documented and kept on student record, be considered academic misconduct and just cause for disqualification of course completion.
- iLearn/Moodle quizzes will be released by instructor as per course instruction schedule. Consideration will be given for exam preparation 2 days prior to exams.

**Student Academic Support Services**

It is the College’s goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on a disability, please let your instructor know immediately so options can be discussed. You are also welcome to contact Student Academic Support Services to establish reasonable accommodations. Please call 780-791-8934 or drop in at CC167.

It is your responsibility to contact the Office of the Registrar to **update your contact information** and complete forms related to changes of registration.

### **Keyano College**

#### **Office of the Registrar**

8115 Franklin Avenue Fort McMurray, AB

T9H 2H7

Tel: (780) 791-4801

Fax: (780) 791-4952

Keyano College Main Switchboard Toll Free: 1-800-251-1408

Email: [registrar@keyano.ca](mailto:registrar@keyano.ca)

[www.keyano.ca](http://www.keyano.ca)

Please be advised, the Office of the Registrar will only use Keyano student email to communicate with students. Check your student email regularly for important information.

### **Learning Outcomes**

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 as they apply to drawing vector diagrams.
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 behavior is affected when external forces are applied.
9. Perform calculations pertaining to common power transmission systems.
10. Identify basic types of matter, their properties, and the associated chemical principles.
11. Explain the principles and laws of thermodynamics.
12. Explain the modes of heat transfer and the theory of heat exchanger operation.
13. Apply the thermodynamic principles through practical applications using the steam tables and the temperature-enthalpy chart.
14. Describe the Power Engineer profession.

15. Describe the application of Jurisdictional Acts and Regulations with respect to boilers and pressure vessels.
16. Describe the purpose of boiler and pressure vessel Codes and Standards.
17. Describe general plant safety as it relates to Power Engineers.
18. Describe common safety programs generally applied in plants.
19. Describe the policies and procedures for safe storage and handling of dangerous materials.
20. Explain fire safety in an industrial plant.
21. Describe typical fire extinguishing equipment and its operation in plant environments.
22. Identify environmental considerations and how they relate to an operating plant.
23. Explain how gas and noise emissions affect plant operations.
24. Explain how liquid and solid emissions affect plant operation.
25. Describe the mechanical properties of engineering materials used in engineering.
26. Describe welding processes relevant to the plant and Power Engineering.
27. Describe inspection processes and testing methods for welds and materials.
28. Discuss the basic types of piping, piping connections, supports, and drainage devices used in industry.
29. Discuss the design and uses of the valve designs most commonly used in industry and on boilers.