

**Power Engineering: On-Line  
Fourth Class**

## **PELM 4100 Applied Science**

*4 credits*

Topics include applied mathematics, elementary mechanics and dynamics, elementary thermodynamics, mechanical drawing, administration, industrial legislation, workplace hazardous materials, plant safety and plant fire protection as identified in the Alberta Boilers Safety Association Reference Syllabus for 4th Class Part A Power Engineering.

**Recommended Prerequisites:** It is strongly recommended that students have Math 20/23 or Math 20 Applied, Physics 20 or Science 20 and English 20 (Grade 11).

### **Instructor(s)**

John Cook (Chairperson)  
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Office#: BL157

Lawrence Brooks  
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Office#: BL153

### **Tutoring hours**

Tuesday & Thursday 6:30 – 9:30 pm

Instructors are available outside of the above hours.

Please contact the Power Engineering office at 780 791-4955 for an appointment.

### **Supervised Exams**

Please contact the Power Engineering office to schedule your supervised exam –  
780 791-4955

**Required Resources:** (Available at Keyano College Bookstore)

Power Engineering Fourth Class (Textbook), Part A1 PanGlobal, Edition 2.5, ISBN 978-1-897461-27-3

Academic Supplement, PanGlobal, 2009 Edition, ISBN 978-1-897143-13-4

2007 ASME Boiler & Pressure Vessel Code, An International Guide, Academic Abstract American Society of Mechanical Engineering, 2007 Edition, ISBN 978-1-897461-24-2

**Recommended Resource:** (Available at Keyano College Bookstore)

Power Engineering Fourth Class (Workbook), Part A1 PanGlobal, Edition 2.5, ISBN 978-1-9-897461-32-7

**Course Outcomes**

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

- Apply basic mathematical processes to solve power engineering related applications.
- Apply basic physics principles to solve power engineering related applications.
- Describe the principles of thermodynamics of steam and heat transfer.
- Design and demonstrate skills in sketching and writing fundamentals that are used in plant administration and engineering.
- Describe and apply industrial codes and provincial legislation relating to boilers, pressure vessels and pressure welders.
- Recognize and apply workplace hazardous materials information system (WHMIS) legislation that impacts different industrial workplace settings.
- Identify and describe safe work practices required in an industrial setting, including the acquisition of certifications in first aid/CPR, H2S Alive and OSHA.
- Recognize and describe initial response fire extinguishing tools and systems to apply to industrial scenarios.

## Evaluation

Students will be graded using percentage scales.

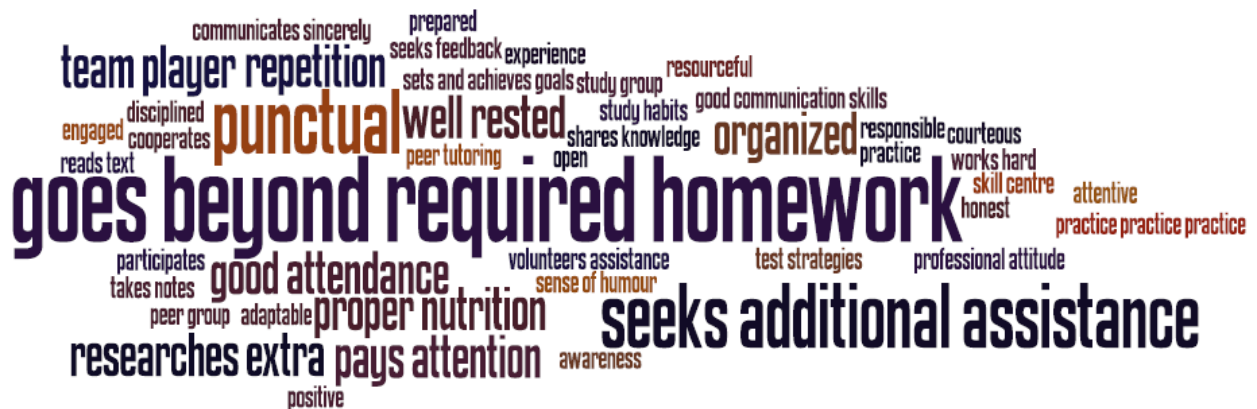
Category	Weight
Section "S" Test	10%
Section "S" Test	10%
"E" Exams (Supervised)	70%
Moodle Chapter & Unit Quizzes	10%
Total Grade	100%

*The minimum standard for passing all "S" & "E" exams and the overall course is a grade of 65%.*

## Performance Requirements

The Power Engineering online program provides access to a comprehensive computer question bank designed to highlight subjects in the Alberta Boiler's Branch syllabi. Assessments are generated and marked by the Computer and Power Engineering Instructors. The online program is supplemented by tutorial assistance offered by qualified instructors during posted hours.

## 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 study group purposes. The SKILL Centre is for “support” not to “teach” you course content due to lack of attendance.

	<b>Monday - Friday</b>
<b>Monday to Friday</b>	<b>8:30 – 4:30</b>

**Additional evening & weekend tutorial hours will be posted in the Skill Centre or please contact [skill@keyano.ca](mailto:skill@keyano.ca) to confirm tutoring availability.**

**Academic Regulations**

Refer to page 26-40 of the Keyano College 2013-2014 Credit Calendar or use this link to view Keyano College’s [Academic Regulations](#):

**Keyano College Student Rights and Responsibilities:**

It is the student’s responsibility to read the Student Rights and Responsibility Policy document found in the Keyano College Credit Calendar 2013-2014, pages 36-40. The information contained in this policy should guide the student’s conduct while attending Keyano College. Below are a few “Highlights” to note:

**Student Rights:** The student has the right to:

- reasonable freedom of opinion and expression in the classroom, in assignments, and in exams, where course content allows.
- confidentiality of his/her personal records.
- proper and impartial evaluation of his/her performance and the right to request a re-evaluation within time lines and procedures established by the College.
- freedom from being subjected to physical, verbal, mental, or sexual harassment including any indignity, injury, violence or unfair accusation.

**Student Responsibilities:** The student has the responsibility to:

- respect the rights of ALL others. Respect is earned.
- refrain from threatening to subject or subjecting any person to physical, verbal, mental, or sexual harassment including any indignity, injury, violence or unfair accusations.
- respect the faculty member's right to determine course methodology, evaluation, right to set deadlines for assigned work, and to establish penalties for failure to comply with deadlines.
- refrain from unduly disturbing, disrupting or otherwise interfering with studies, laboratories, lectures, work or other activities of fellow students or staff.
- know the consequences of plagiarism, fraud, deceit, and/or other forms of academic and non-academic dishonesty.
- not openly share marks and other confidential information/material in the classroom.

## Teaching & Learning Methodologies

The Power Engineering online program through iLearn (Moodle); <http://ilearn.keyano.ca> is a system that provides students with a quick assessment of their academic achievement while they progress at their own pace, on their own schedule. Students can enroll at any time and have one year from the date of registration to complete both Part A and B theory. A total of two three-month extensions may be purchased. Extended hours and the ability for students to access the system from home or work are features designed to make the training as accessible as possible. **Please note:**

- iLearn/Moodle will be used for ongoing assessment purposes. Please be patient and forward questions/concerns regarding the test bank to the Power Engineering Department.
- 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 “kick” 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.**

## Specialized Supports & Duty to Accommodate

### **Disability Support Services: Learner Assistance Program (LAP):**

If you have a documented disability or you think that you would benefit from some assistance from a Disabilities Counsellor, please call or visit the Disability Supports Office 780-792-5608 to book an appointment (across from the library). Services and accommodations are intended to assist you in your program of study, while maintaining the academic standards of Keyano College. We can be of assistance to you in disclosing your disability to your instructor, providing accommodations, and supporting your overall success at Keyano College.

### **Specialized Supports and Duty to Accommodate:**

Specialized Support and Duty to Accommodate are aligned with the office of Disability Support Services: Learner Assistance Program (LAP) guided by federal and provincial human rights legislation, and defined by a number of Keyano College policies. Keyano College is obligated by legislation to provide disability-related accommodations to students with identified disabilities to the point of undue hardship.

**Please Note:** 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)

## Learning Outcomes

1. Describe the overall industrial background and certification system for Power Engineering
2. Perform simple calculations involving SI units.
3. Perform basic arithmetic operations without the use of a calculator.
4. Perform basic arithmetic operations involving fractions, decimals and percentages.
5. Describe the concepts of ratio and proportion.
6. Transpose equations in order to find values for different variables in a formula.
7. Describe measurement of length, types of lines and angles, and calculate perimeters and areas of simple plane figures.
8. Calculate: the volumes of regular objects, cylinders, and spheres; and the surface areas of cylinders and spheres.
9. Define basic terms used in the study of mechanics.
10. Perform calculations using forces and moments, and determine whether or not a system is in equilibrium.
11. Define simple machines and do calculations relating to them.
12. Define and identify scalar and vector quantities and solve simple vector problems graphically.
13. Define speed, velocity, distance, displacement, and acceleration and solve simple linear problems involving velocity, time and distance.
14. Differentiate among force, work, power, pressure and energy and perform calculations involving the relationships between these mechanical terms.
15. Describe and solve problems involving friction.
16. Discuss the deformations of bodies, caused by externally applied forces, and the internal forces that resist these deformations; discuss the physical properties of materials and explain how these properties affect their behavior when external forces are applied.
17. Discuss the major types of power transmission systems.
18. Explain the principles of thermodynamics, including the laws of thermodynamics and the modes of heat transfer.
19. Describe the principles of the thermodynamics of steam and the associated terms.
20. Discuss the basic types of matter and their properties.

21. Make basic engineering sketches of plant equipment.
22. Identify correct and effective sentence structures and revise poorly worded sentences for clarity, conciseness, and correctness.
23. Write a unified, coherent paragraph using a clear topic sentence, technical terminology and specific support, given a technical topic.
24. Plan, write and edit routine and positive messages in memo format, given a work-related scenario.
25. Discuss the purpose of codes and provincial acts and regulations with respect to boilers and pressure vessels.
26. Explain the significance of the Workplace Hazardous Materials Information System (WHMIS) and its application to the worksite.
27. Discuss the significance of the Workplace Hazardous Materials Information System (WHMIS) and its application to the worksite.
28. Explain the components of the WHMIS Material Safety Data Sheet and its application in the worksite and terminology used on the MSDS.
29. Describe the costs and effects of workplace injuries on the individual worker and business.
30. Describe the use, selection and care of personal protective equipment
31. Describe the general procedures involved in the isolation of plant equipment.
32. Describe procedures needed to enter into and work safely within confined spaces.
33. Describe the procedures for safe storage and handling of cylinders containing compressed gasses.
34. Describe the safe procedures for the loading, storage, unloading and transportation of hydrocarbon fluids.
35. Discuss hydrogen sulphide (H<sup>2</sup>S) in terms of its properties, its effects on humans, and its presence in the workplace.
36. Identify possible or potential medical difficulties in a person and provide assistance until professional medical aid can be obtained.
37. Describe the fire classifications and the types of extinguishing media suitable for each classification.
38. Describe the types of portable fire extinguishers and their application for each fire classification.
39. Discuss the causes of and preventive measures for electrical fires.