

Program

Summer 2021

4th Class Power Engineering Online

PELM 4100 Applied Science

4 credits

Topics include elementary mechanics and dynamics, elementary physical, chemical, and thermodynamic principles, legislation, codes, and standards, plant and fire safety, plant operations and the environment, and 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.

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).

Instructors

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Contact Information

Keyano College Power Engineering Department
780-791-4955
Powerprocess@keyano.ca

Tutoring Hours

Please contact the Power Engineering office at 780-791-4955 for an appointment. Tutoring will be delivered through Microsoft Teams.

Required Resources

(Available at Keyano College Bookstore)

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 978-177251108-6

Recommended Resources

(Available at Keyano College Bookstore)

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

Power Engineering Fourth Class (Workbook), Part A PanGlobal, Edition 3.0, ISBN 978-1-77251-075-1

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.

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.

Evaluation

Students will be graded using percentage scales.

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

The minimum standard for passing 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



Student Responsibilities

It is your responsibility as a student to contact the Office of the Registrar to complete the forms for Withdrawal or Change of Registration, and any other forms. Please refer to the list of important dates as noted in the Academic Schedule in the [Keyano College credit calendar](#). The Keyano College credit calendar also has information about Student Rights and Code of Conduct. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

Student Attendance

Class attendance is useful for two reasons. First, class attendance maximizes a student's learning experience. Second, attending class is a good way to keep informed of matters relating to the administration of the course (e.g., the timing of assignments and exams). Ultimately, you are responsible for your own learning and performance in this course.

It is the responsibility of each student to be prepared for all classes. Students who miss classes are responsible for the material covered in those classes and for ensuring that they are prepared for the next class, including the completion of any assignments and notes that may be due.

Academic Misconduct

Students are considered to be responsible adults and should adhere to principles of intellectual integrity. Intellectual dishonesty may take many forms, such as:

- Plagiarism or the submission of another person's work as one's own;
- The use of unauthorized aids in assignments or examinations (cheating);
- Collusion or the unauthorized collaboration with others in preparing work;
- The deliberate misrepresentation of qualifications;
- The willful distortion of results or data;
- Substitution in an examination by another person;
- Handing in the same unchanged work as submitted for another assignment; and
- Breach of confidentiality.

The consequences for academic misconduct range from a verbal reprimand to expulsion from the College. More specific descriptions and details are found in the Student Rights and Code of Conduct section of the Keyano College credit calendar. It is the responsibility of each student to be aware of the guidelines outlined in the Student Rights and Code of Conduct Policies.

In order to ensure your understanding of the concept of plagiarism, you must successfully complete the online tutorial found on ilearn.keyano.ca. Then print the certificate, sign it, and show it to each of your instructors. Your course work may not be graded until you show this signed certificate.

Specialized Supports

The Student Services department is committed to Keyano students and their academic success. There are a variety of student supports available at Keyano College. Due to the continuing situation with the Covid-19 pandemic, the offered support services will be implemented differently this semester by being provided mostly virtually. In-person service can be requested as needed. All Alberta Health Services guidelines will be followed for in-person appointments—wear a mask, maintain two meters of physical distance, use hand sanitizer, and stay home if you are unwell.

All student services are available during Keyano business hours: Monday to Friday, 8h30-16h30. The Library has evening and weekend hours. Please check keyano.ca/library for current hours.

Accessibility Services: provides accommodations for students with disabilities. Students with documented disabilities, or who suspect a disability, can meet with a Learning Strategist to discuss their current learning barriers and possible accommodations. Students who have accessed accommodations in the past are encouraged to contact us to request them for the semester. Please

note that requesting accommodations is a process and requires time to arrange. Contact us as soon as you know you may require accommodations. For accessibility services supports and to book a virtual appointment, please contact accessibility.services@keyano.ca.

Accessibility Services also provides individual and group learning strategy instruction for all students, as well as technology training and supports to enhance learning. Meet with a Learning Strategist to learn studying and test-taking strategies for online classes. Schedule an appointment with the Assistive Technology Specialist to explore technology tools for learning. Book an appointment today by emailing accessibility.services@keyano.ca

Academic Success Coaching: offers you support and access to resources for your academic success to help you to find the Keys to your Success. The Academic Success Coach will work with you to develop an academic success plan, develop your study and time management skills, and connect you with the right resources here at Keyano. Academic.success@keyano.ca is the best way to access resources during virtual service delivery.

Wellness Services: offers a caring, inclusive, and respectful environment where students can access free group and individual support to meet academic and life challenges. Mental Health Coordinators offer a safe and confidential environment to seek help with personal concerns. All individual appointments will continue virtually.

Wellness Services welcomes students to participate in any of the virtual group sessions offered throughout the academic year addressing topics including mindfulness and test anxiety.

Individual virtual appointments can be made by emailing wellness.services@keyano.ca.

Library Services: provides students with research and information supports as they engage in their studies. Library staff are available to support you both virtually and in person during the fall semester. For library service supports and inquiries, please email askthelibrary@keyano.ca.

Individual support with the Information Librarian will be provided virtually. Appointments can be requested by email or by placing a [Book a Librarian](#) request using the online form found [here](#).

Research and Subject Guides are helpful resources when conducting research or addressing your information needs. To view a subject or course specific guide, use the following [Subject Guides link](#)

To access additional research resources, including Citation Guides (APA, MLA, Chicago, or IEEE), go to the [Research Help Library page](#).

Skill Centre: provides academic support services to students registered in credit programs at Keyano College in the form of tutoring, writing support groups, facilitated study groups, workshops and study space. Tutoring services are **free** to Keyano students. Tutoring is available for Math, Writing, English, and Science subject areas.

While most courses are being offered online, the Skill Center will be offering mostly virtual tutoring services and in-person sessions as requested. Please email Skill.centre@keyano.ca to get in contact with our tutoring staff.

For the most up to date information on how to book a tutoring session, please view the [Keyano Skill Centre homepage](#).

E-Learning

Technology and internet will impact your online learning experience. It's important that you are able to watch an online video and other course materials, take online quizzes, and participant in a live class with your instructor and other students.

Keyano College operates in a Windows based environment and having the correct tools for online learning is important. Here's a list of recommended system requirements for Fall 2020.

Internet Speed

Minimum Internet speeds of 5 Mbps.

Recommended Internet speeds of 25 Mbps (especially if you are sharing your internet at home).

Check your internet speed with Fast.com.

System requirements:

Microsoft Windows	Apple
<p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Windows 10 computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office</u> software is free to all Keyano students and employees. • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software 	<p>Minimum Requirements:</p> <ul style="list-style-type: none"> • A Macintosh (V10.14 and above) computer/laptop • Minimum 4GB of RAM. • 10GB+ available hard drive storage. • Enough available hard drive space to install the Microsoft Office suite (approximately 3GB). <u>Microsoft Office</u> software is free to all Keyano students and employees. • Microphone, webcam and speakers. A headset with a microphone is recommended. • System updates must be regularly installed. • Anti-Virus / Anti-Malware software.
<p>Recommended Requirements</p> <ul style="list-style-type: none"> • 8GB of RAM • A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free. 	<p>Recommended Requirements</p> <ul style="list-style-type: none"> • 8GB of RAM • A method of backing up/synchronizing to local or cloud-based storage such as OneDrive is highly recommended. This is included if you complete the setup of KeyanoMail and download MS Office using your Keyano email for free.
<p>Chromebooks are not recommended as they are not compatible with testing lockdown browsers.</p> <p>A Microsoft Surface or iPad or iPad Pro may be possible alternatives in some program areas.</p>	

Specific department requirements:

Business and OA programs require Windows 10.

Other programs may utilize Windows based tools as well.

Computer Software

Students will be able to get access to Microsoft Office 365 for Free using Keyano Credentials by [clicking here](#).

Recording of lectures and Intellectual Property

Students may only record a lecture if explicit permission is provided by the instructor or by Accessibility Services. Even if students have permission to record a lecture or lecture materials, students may not publish any of the lectures or lecture materials, this includes any recordings, slides, instructor notes, etc. on any platform. Thus no student is allowed to publish or sell instructor notes without formal written permission. It is important to recognize that the Canadian Copyright Act contains provisions for intellectual property.

ITS Helpdesk

If you are having issues with your student account, you can contact the ITS Helpdesk by emailing its.helpdesk@keyano.ca or calling 780-791-4965.