PELM 4200 Plant Services
4 credits

Areas covered are environment, material and welding, piping and valves, high pressure boiler design, high pressure boiler parts and fittings, high pressure boiler operation and feedwater treatment 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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**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)

Recommended Resource: (Available at Keyano College Bookstore)

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

• Recognize the various types of environmental pollutants, their origin and their adverse effects.
• Illustrate methods to control and mitigate ill effects of environmental pollutants.
• Describe how mechanical properties of materials affect the art of welding, fabrication and inspection techniques.
• Recognize and select appropriate valves, piping and fittings pertaining to the safe operation of plant mechanical equipment.
• Describe the many types of high pressure boilers along with their construction and operating parameters, including ancillary equipment.
• Describe the start-up, shutdown and emergency procedures as applied to high pressure boilers.
• Apply basic chemical principles to the analysis of boiler feedwater to maintain boiler efficiency and longevity.
Evaluation

Students will be graded using percentage scales.

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<th>Category</th>
<th>Weight</th>
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<tr>
<td>Section “S” Test</td>
<td>10%</td>
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<tr>
<td>Section “S” Test</td>
<td>10%</td>
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<tr>
<td>“E” Exams (Supervised)</td>
<td>70%</td>
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<tr>
<td>Moodle</td>
<td>10%</td>
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<tr>
<td>Chapter &amp; Unit Quizzes</td>
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<tr>
<td>Total Grade</td>
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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.

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Additional evening & weekend tutorial hours will be posted in the Skill Centre or please contact 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 breech 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
www.keyano.ca
Learning Outcomes

1. Describe the interaction and interdependency between the various elements of the environment.
2. Name gaseous pollutants related to power plants, describe their effect upon the environment and discuss some methods used for their control as well as describe noise pollution related to power plants.
3. Discuss methods of handling solid pollutants produced by power plants and the problems and solutions in regard to liquid thermal pollutants.
4. Explain the impact of liquid waste on the environment.
5. Explain the impact of gases and vapours on the environment.
6. Explain the environmental impacts of industrial operating facilities.
7. Describe the mechanical properties of engineering materials and the ability of alloying elements to change the mechanical properties of materials and identify nonferrous materials as used in engineering.
8. Describe oxyacetylene welding and electric arc welding and the applications of each.
9. Describe welding terms and methods of weld inspection.
10. Discuss the basic types of piping, piping connections, supports and drainage devised used in industry.
11. Discuss the design and uses of the valve designs most commonly used in industry and on boilers.
12. By using common terms relating to boilers discuss the historical developments of, and the general requirements for proper boiler design.
13. Describe various watertube boiler designs, including large generating units.
14. Describe electric boilers in regard to their use and general design.
15. Describe fabrication and general construction features of watertube and firetube boilers.
16. Discuss, draft and describe the basic equipment used to supply combustion air to a boiler furnace.
17. Discuss the basic theory of combustion in a boiler and the equipment used to provide proper combustion conditions.
18. Discuss the basic theory and design of a fluidized bed steam generator and describe the special operational and control aspects of fluidized bed combustion.
19. Discuss the design and operation of safety valves for power and heating boilers.
20. Describe different types of direct and inferential level gauges or indicators.
21. Describe typical internal components of steam drums.
22. Discuss the design and operation of sootblowers.
23. Describe the purposes, equipment and operation of continuous and intermittent blowdown.
24. Describe the basic preparation of a boiler for start-up and shutdown procedures.
25. Discuss routine and emergency practices for operation of a packaged boiler.
26. Discuss the general principles, methods and equipment used in preparing raw feedwater for steam production in a boiler.
27. Discuss the general principles, methods and equipment used for the internal treatment of boiler water.