

Process Operations: Co-op
Fourth Class
Year 1, Term 1

PROC 102 Plant Services

4 credits, 4 weeks, 120 hours

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.

Instructors

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Office hours

As per request from students, instructors are available outside of instructional hours.

Required Resources: (Available at Keyano College Bookstore)

Power Engineering Fourth Class (Textbook), Part A2 PanGlobal, Edition 2.5, ISBN 978-1-897461-28-0

Power Engineering Fourth Class (Workbook), Part A2 PanGlobal, Edition 2.5, ISBN 978-1-897461-33-4

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

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.

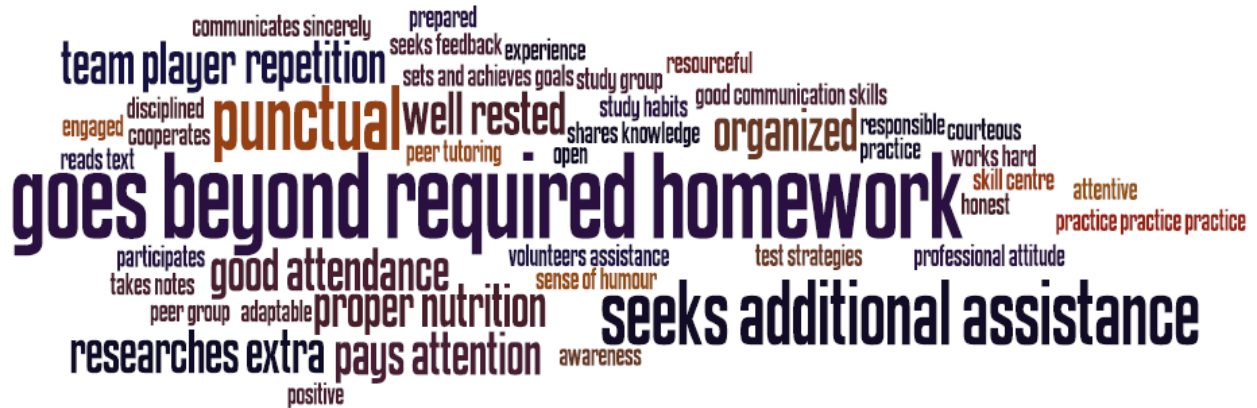
Category	Weight
Section "S" Test	20%
Section "S" Test	20%
"E" Exams	35%
Workbook	15%
Moodle Chapter & Unit Quizzes	10%
Total Grade	100%

*The minimum standard for passing all S & E exams and the overall course is a grade of 65%. 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. Students shall not exceed four days absenteeism during year one, term one which is the four month theory based training period.

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.

	Monday - Friday
Monday to Friday	8:30 – 4:30

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.

Instructor Responsibilities: The instructor has the responsibility to:

- establish, post and enforce classroom ground rules to promote the student learning experience. This may include the promotion and application of electronic devices for learning purposes. If abused, then this privilege may be taken away.
- accommodate students with different learning styles and disabilities.
- be prepared and committed to effective time management and relevance of theory and application.
- be actively available, and maintain a physical presence in the classroom in order to monitor student learning in a timely manner.
- address student concerns encountered with Moodle test bank.
- acknowledge student diversity and treat ALL students with respect. Respect is earned.
- enhance the classroom learning environment by incorporating actively engaging activities, arranging relevant lab/shop tours, utilizing posters/visuals/manipulatives and sharing of relevant experiences. Remind students the classroom reflects a typical work site, thus is not a democracy (i.e. cell phones, breaks, etc.).
- exercise discretion with regards to student attendance and tardiness.
- ensure examinations are fair and align with student learning outcomes.

Teaching & Learning Methodologies

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

- 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 “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.**
- 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.

This course is also supplemented by **Mentor 3D**; www.mentor3D.keyano.ca which is an online, interactive 3D animation program to support student learning of some program concepts and procedures. Access to this technology is not automatic and requires student registration and password access which may be available upon request to the instructor. Access may take up to 48 business hours to process.

In addition, applicable **lab tours** will be planned to enhance the student learning experience, when opportunities exist.

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.

Authorization:

This course outline has been authorized by the following individuals:

Instructor(s)

John Cook (Department Chair Person)

Course Outline Effective Date: -----