Course Outline

Process Operations: Co-op

Fourth Class

Year 1

PROC 102 Plant Services

4 credits, 4 weeks, 120 hours

Areas covered are elements of basic concepts in electro-technology, energy plant instrumentation and controls, fundamental industrial communication skills, introduction to boiler designs, and elements of boiler systems as identified in the Alberta Boilers Safety Association Reference Syllabus for 4th Class Part A Power Engineering.

Instructors

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Office hours

Instructors are available outside of instructional hours upon request from student.

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

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 Resources:

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:

- Describe basic electricity and electromagnetism, an apply concepts to calculations using voltage, current, resistance, and power.
- Discuss metering devices, motors, generators, and transformers, and understand electrical distribution circuits.
- Describe energy plant controls and instrumentation, as well as process measurement and types of control systems commonly used in plants.
- Illustrate methods of plant communications, energy plant sketching, and plant diagrams, and understand the importance of these with regard to safe plant operation.
- Describe common types of boilers found in power and heating applications, including their construction and ancillary equipment.
- Describe the elements, and importance, of various boiler systems including fuels and combustion, draft, feedwater, blowdown, and sootblowing.

Evaluation

Students will be graded using percentage scales.

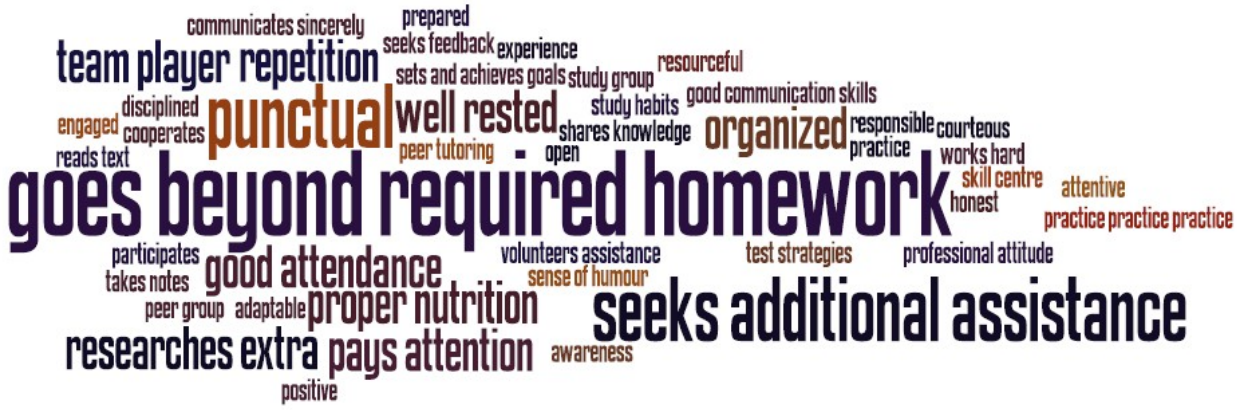
Category	Weight
Section "S" Test	20%
Section "S" Test	20%
"E" Exams	40%
Moodle Chapter & Unit Quizzes	20%
Total Grade	100%

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	**9:00 – 4:00**

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 pages 25 & 26 of the Keyano College 2017-2018 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 2016-2017, pages 34-37. 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 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.**
- 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. Apply the concepts of basic electricity while preforming simple calculations using voltage, current, resistance, and power.
2. Describe the basic principles of magnetism.
3. Describe the design and application of electrical metering devices.
4. Describe the operating principles of the various types of AC and DC motors and generators.
5. Describe the operating principles of electrical transformers.
6. Describe an electrical distribution system.
7. Describe the overall purpose and function of plant instrumentation systems.
8. Describe the construction and operation of common devices used to measure pressure, level, flow, temperature, humidity, and composition.
9. Describe the basic types and functions of transmitters, recorders, controllers, and control actuators.
10. Describe the operation of programming controls for boilers, including applicable testing and maintenance procedures.
11. Describe the design and operation of electronic control systems.
12. Describe the design and operation of electrical control systems.

13. Make basic engineering sketches of plant equipment.
14. Identify common types of diagrams used in plants.
15. Describe the types and proper usage of plant communication systems.
16. Describe the historical development of boilers, boiler design, components, and configuration.
17. Describe the design, components, and characteristics of firetube boilers.
18. Describe the design, components, and characteristics of watertube boilers.
19. Explain the general design and application of electric boilers.
20. Describe the special design considerations of boilers used in heating plants.
21. Differentiate between ASME Section I and ASME Section IV boilers.
22. Discuss the basic theory of combustion and the equipment used to provide proper combustion conditions within a boiler.
23. Describe common fuel systems found in boiler systems.
24. Describe basic concepts and equipment used to supply combustion air to boiler furnaces.
25. Describe Feedwater systems used with boilers.
26. Describe the equipment, operation, and purpose of boiler blowoff and blowdown systems.
27. Describe the importance of fireside cleanliness, and the equipment and methods to maintain fireside cleanliness