Course Outline

4th Class Power Engineering Coop
2019 Fall PECO 4200 A

PECO 4200 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
As per request from students, instructors are available outside of instructional hours. Please arrange a time with your instructor.

Required Resources: (Available at Keyano College Bookstore)

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.

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Section “S” Test</td>
<td>20%</td>
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<tr>
<td>Section “S” Test</td>
<td>20%</td>
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<tr>
<td>“E” Exams</td>
<td>40%</td>
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<tr>
<td>Moodle Chapter &amp; Unit Quizzes</td>
<td>20%</td>
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<tr>
<td>Total Grade</td>
<td>100%</td>
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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.

Behaviours of a Successful Student

- Team player repetition
- Punctual
- Well rested
- Goes beyond required homework
- Good attendance
- Proper nutrition
- Seeks additional assistance
- Good communication skills
- Organized
- Good work habits
- Responsible
- Professional attitude
- Takes notes
- Peer group adaptable
- Practices
- Researches extra pays attention
- Positive
- Sense of humour
- Prepared
- Seeks feedback experience
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 student group purposes. The SKILL Centre is for support and reinforcement of course concepts. Hours of operation are Monday – Friday 8:30am - 4:30pm. Additional evening and weekend tutorial hours will be posted in the Skill Centre or please contact skill@keyano.ca to confirm tutoring availability.

Keyano College Student Rights and Code of Conduct:
It is the student’s responsibility to familiarize themselves with the Student Rights and Responsibility Policy found in the Keyano College Credit Calendar 2019-2020, pages 40-43. The information contained in this policy should guide the student’s conduct while attending Keyano College.

Teaching & Learning Methodologies
This course is delivered in a classroom setting, supplemented by online testing through iLearn/Moodle; http://ilearn.keyano.ca

- 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 eject 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.
Student Academic Support Services

It is the College’s goal that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on a disability, please let your instructor know immediately so options can be discussed. You are also welcome to contact Student Academic Support Services to establish reasonable accommodations. Please call 780-791-8934 or drop in at CC167.

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

Please be advised, the Office of the Registrar will only use Keyano student email to communicate with students. Check your student email regularly for important information.

**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.