

## 3<sup>rd</sup> Class Power Engineering Coop

### **PECO 3100 Applied Science**

*4 credits, 4 weeks, 120 hours*

Topics include applied math, applied mechanics, thermodynamics, and applied science as identified in the Alberta Boilers Safety Association Reference Syllabus for the first paper of 3<sup>rd</sup> 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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## Office hours

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

## Required Resources

Power Engineering Third Class (Textbook), Part A2 PanGlobal, Edition 2.0, ISBN 978-1-897461-40-2

2018 ASME Boiler & Pressure Vessel Code Volume 2, Academic Extract, 2018 Edition, ISBN 978-1-77251109-3

## Course Outcomes

1. Demonstrate knowledge in basic mathematics, trigonometry, mensuration, Algebra, logarithms, problem solving, vectors, forces & friction, work done in objects in motion, power, energy and Linear & Angular motion relationships.
2. Demonstrate knowledge of strength of Materials, flow, heat, state changes, density, pressures, simple machines, bending of beams, calorimetry, thermal expansion and heat transfer.
3. Demonstrate knowledge of saturation of steam, steam tables, temperature-enthalpy, evaporation, calculations, gas laws & equations, expansion of gases, and calculate work done on gases.
4. Analyze chemistry fundamentals including electronegativity, periodic table of elements, organic chemistry, water treatment and metallurgy & materials.
5. Demonstrate knowledge of the principles of corrosion that affect boilers, pressure vessels and pressure piping including galvanic corrosion, atmospheric, stray current, biological, along with inspection techniques.
6. Demonstrate knowledge of process & instrument flow drawings, material balance drawings, construction drawings and equipment layout drawings.

## Evaluation

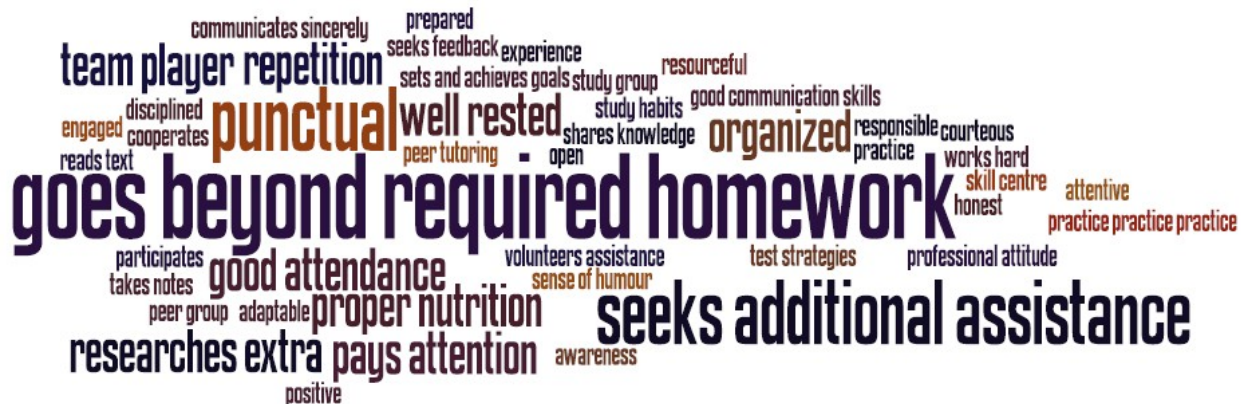
Quizzes.....	20%
Section Test 1 .....	20%
Section Test 2 .....	20%
Exam 1.....	40%
Total .....	100%

*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.

## 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 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](mailto: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 2017-2018. 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 breach 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](mailto:registrar@keyano.ca)

[www.keyano.ca](http://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. Solve problems using algebraic operations, including equations and logarithms.
2. Explain trigonometric concepts and solve problems involving trigonometry.
3. Solve problems involving the areas of plane figures and the surface areas and volumes of three-dimensional objects.
4. Explain concepts and solve problems involving vectors, force systems and friction.
5. Explain concepts and solve problems involving work, power, energy, linear motion, and angular motion.
6. Explain concepts and solve problems involving material stresses and bending of beams.
7. Explain concepts and solve problems involving simple machines and fluids.
8. Explain heat terminology and perform heat calculations during changes of state and calorimeter tests.
9. Explain concepts and perform calculations involving the thermal expansions of solids and liquids and heat transferred through a substance.
10. Define properties of saturated and superheated steam and, using information from the steam tables, calculate the heat required to produce steam at various conditions; determine the evaporation in steam boilers.
11. Explain the laws of perfect gases and perform calculations involving the expansion and compression of gases.
12. Explain the fundamental principles in the structure, formation and interaction of chemical compounds and the importance of chemistry in industrial operations.

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13. Explain the production, properties and applications of metallic and non-metallic materials.
  14. Explain the mechanisms that cause corrosion and the methods used to monitor and control corrosion.
  15. Identify and interpret components of typical engineered drawings used in industry.