

**Power Engineering: Co-op  
Third Class**  
Year 2, Term 1

## **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 3rd 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**

John Cook (Chairperson)  
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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 Third Class (Textbook), Part A1 PanGlobal, Edition 2.0, ISBN 978-1-897461-40-2

Power Engineering Third Class (Workbook), Part A1 PanGlobal, Edition 2.0

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:

- Apply mathematical operations to thermodynamic calculations and applied mechanics problems.
- Perform calculations by examining the relationship between work, power, energy & motion.
- Interpret engineering data with respect to mechanical properties of material construction and machinery.
- Perform thermal calculations as it applies to heat transfer, calorimetry, steam tables and gas loss.
- Analyze and apply chemistry fundamentals as it relates to water treatment, corrosion, combustion and hydrocarbon processing.
- Describe cause and effects of corrosion impacting plant operations.
- Apply testing methods by examining the basic structure, properties and application of various alloying elements.
- Interpret and produce process & instrument flow drawings, material balance drawings, construction drawings and equipment layout drawings using standardized industry symbols and techniques.

## Evaluation

Students will be graded using percentage scales.

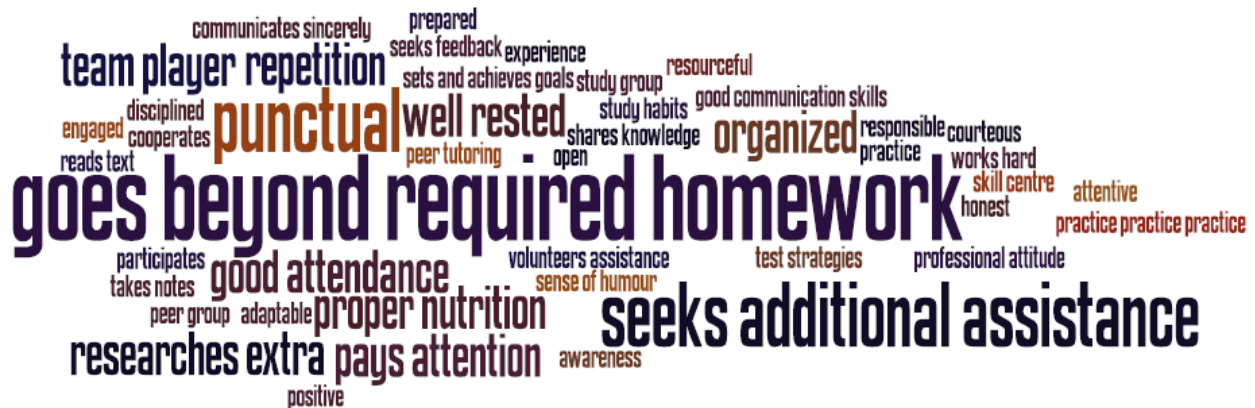
Category	Weight
Section "S" Test	20%
Section "S" Test	20%
"E" Exams	35%
Workbook	15%
Moodle Chapter & Unit Quizzes	10%
Total Grade	100%

*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](mailto: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](http://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](mailto:registrar@keyano.ca)

[www.keyano.ca](http://www.keyano.ca)

## 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.
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.

**Authorization:**

This course outline has been authorized by the following individuals:

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Instructor(s)

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John Cook (Department Chair Person)

Course Outline Effective Date: -----