

## **PELM 3100 Applied Science**

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**

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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

Power Engineering Fourth Class (Textbook), Preparatory Topics for Power Engineers, PanGlobal, ISBN 978-1-77251-074-4

Power Engineering Fourth Class (Workbook), Part A PanGlobal, Edition 3.0, ISBN 978-1-77251-075-1

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

**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.



**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.

	<b>Monday - Friday</b>
<b>Monday to Friday</b>	<b>9:00 - 4:00</b>

**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 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.

## Teaching & Learning Methodologies

The Power Engineering online program through iLearn (Moodle); <http://ilearn.keyano.ca> is a system that provides students with a quick assessment of their academic achievement while they progress at their own pace, on their own schedule. Students can enroll at any time and have one year from the date of registration to complete both Part A and B theory. A total of two three-month extensions may be purchased. Extended hours and the ability for students to access the system from home or work are features designed to make the training as accessible as possible. **Please note:**

- iLearn/Moodle will be used for ongoing assessment purposes. Please be patient and forward questions/concerns regarding the test bank to the Power Engineering Department.
- 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.**

## 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.