

## PECO 4100, Applied Science

4 Credit, 4 Weeks

### Course Description

Areas covered are elementary mechanics and dynamics, elementary physical, chemical, and thermodynamic principles, legislation, codes, and standards, plant and fire safety, plant operations and the environment, material science and welding technology, and introductory fluid handling technology as identified in the Alberta Boilers Safety Association Reference Syllabus for 4th Class Part A Power Engineering.

### Pre and Co-requisites

Math 20/23 or Math 20 Applied, Physics 20 or Science 20 and English 20 (Grade 11).

### Course Learning Outcomes (CLOs)

*Upon successful completion of the course, the student shall be able to:*

- CLO1 Apply basic terms and calculations used in the study of mechanics.
- CLO2 Perform calculations involving forces and moments and determine when a system of forces is in equilibrium.
- CLO3 Perform calculations relating to mechanical advantage, velocity ratio, and efficiency.
- CLO4 Define and identify scalar and vector quantities as they apply to drawing vector diagrams.
- CLO5 Solve simple problems involving linear velocity, time, and distance.
- CLO6 Perform calculations involving force, work, pressure, power, and energy.
- CLO7 Solve problems involving friction.
- CLO8 Explain physical properties of materials and how their behavior is affected when external forces are applied.
- CLO9 Perform calculations pertaining to common power transmission systems.
- CLO10 Create engineering equipment sketches.
- CLO11 Identify common types of diagrams used in plants.
- CLO12 Describe the types and proper usage of plant communication systems.
- CLO13 Identify basic types of matter, their properties, and the associated chemical principles.
- CLO14 Explain the principles and laws of thermodynamics.
- CLO15 Explain the modes of heat transfer and the theory of heat exchanger operation.
- CLO16 Apply the thermodynamic principles through practical applications using the steam tables and the temperature-enthalpy chart.
- CLO17 Identify environmental considerations and how they relate to an operating plant.
- CLO18 Explain how gas and noise emissions affect plant operations.
- CLO19 Explain how liquid and solid emissions affect plant operation.
- CLO20 Describe the mechanical properties of engineering materials used in engineering.
- CLO21 Describe welding processes relevant to the plant and Power Engineering.
- CLO22 Describe inspection processes and testing methods for welds and materials.

CLO23 Discuss the basic types of piping, piping connections, supports, and drainage devices used in industry.

CLO24 Discuss the design and uses of the valve designs most commonly used in industry and on boilers.

## Evaluation

Assessment Type	Percentage
Chapter and Unit Quizzes	10%
Section Test 1	20%
Section Test 2	20%
E1 - Final Exam	50%

## Course Completion Requirements

Minimum passing mark of 65% or C is required.

## Grading Scale

4.0 Grade Scale	Alpha Grade	Percentage Grade
4.0	A+	93-100
4.0	A	85-92.9
3.7	A-	80-84.9
3.3	B+	77-79.9
3.0	B	74-76.9
2.7	B-	70-73.9
2.3	C+	67-69.9
2.0	C	64-66.9
1.7	C-	60-63.9
1.3	D+	55-59.9
1.0	*D	50-54.9
0.0	F	0-49.9

## Land Acknowledgement

We respectfully acknowledge that Keyano College is on Treaty No. 8 Territory, the ancestral and traditional territory of the Cree, Dene, and Métis people.

Review Date: March 4, 2024

Every effort has been made to ensure that information in this course outline is accurate at the time of publication. Keyano College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.

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