



## DEPARTMENT OF SCIENCE COURSE OUTLINE – Winter 2024

### POF 408 (VA2): 4<sup>th</sup> Class Power Engineering B2 – 4 (15-0-4) 95 Hours over 5 Weeks

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

|               |                                 |         |                                                                                                                                          |
|---------------|---------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------|
| INSTRUCTOR:   | Wells Darling<br>Curran Speager | PHONE:  | 780-539-2819<br>587-343-2154                                                                                                             |
| OFFICE:       | J206<br>L215                    | E-MAIL: | <a href="mailto:Wdarling@nwpolytech.ca">Wdarling@nwpolytech.ca</a><br><a href="mailto:cspeager@nwpolytech.ca">cspeager@nwpolytech.ca</a> |
| OFFICE HOURS: | As posted                       |         |                                                                                                                                          |

### CALENDAR DESCRIPTION:

This course, along with the other 4<sup>th</sup> Class courses, will prepare the student to write the ABSA/SOPEEC Interprovincial examinations. The second section in Part B will cover pumps and compressors, prime movers, engines, heating, cooling and building systems including vapor refrigeration and air conditions systems, and types of plants.

### PREREQUISITE(S)/COREQUISITE:

A high school diploma including at least:

- 50% in English 30-1 or English 30-2
- 65% in Mathematics 30-1 or 70% in Mathematics 30-2
- 65% in Chemistry 30 OR Physics 30

OR

- Mature students not meeting the above requirements may request a review of their education and prior work skills by the Power Engineering Team at NWP.

### REQUIRED TEXT/RESOURCE MATERIALS:



The following textbook and resource materials are required for the full 4<sup>th</sup> Class program, including courses POF 401, 402, 406, and 408. All books are from PanGlobal.org

- 4<sup>th</sup> Class Textbook Set – Part A [Ed. 3.5]
- 4<sup>th</sup> Class Textbook Set – Part B [Ed. 3.5]
- Preparatory Math Topics for Power Engineering [Ed. 2]
- Academic Supplement [Ed. 2.0]
- 2018 ASME Academic Extract (Vol 1)

The first 4 books are available as a bundle

4<sup>th</sup> Class – Standard Collection

<https://mypower.panglobal.org/pshop/4th-class/225-4th-class-standard-collection.html>

2018 ASME Academic Extract (Vol 1)

<https://mypower.panglobal.org/pshop/code-extracts-supplement/198-2018-asme-academic-extract-vol-1.html>

**NOTE: Older editions of Power Engineering textbooks are not acceptable. The changes between editions are enough to impact the likelihood of passing the ABSA exams.**

## DELIVERY MODE(S):

Lecture style presentation of material in person at the NWP Grande Prairie campus. Laboratory provides hands-on experience and will be delivered at the Fairview campus.

## LEARNING OUTCOMES:

: The Standardization of Power Engineers Examination Committee (SOPEEC) has developed a Fourth Class Power Engineer's Syllabus (SOPEEC Syllabus) which has been approved by the Association of Chief Inspectors (ACI) to be used across Canada. A full copy of the current syllabus is available from ABSA at:

[https://www.absa.ca/media/1143/ab-054\\_4th\\_class\\_syllabus\\_new.pdf](https://www.absa.ca/media/1143/ab-054_4th_class_syllabus_new.pdf)

Or SOPEEC at:

<https://www.sopec.org/>

After successful completion of this course you should be able to:

- Prime Movers and Engines
  - o Describe the conversion of heat into mechanical energy and the history of the steam engine.
  - o Describe the construction and operation of steam turbines, cooling towers, condensers, gas turbines, and internal combustion engines.
- Auxiliary Building Systems
  - o Explain lighting, water supply, and drainage systems used in buildings.
- Refrigeration
  - o Describe the basic concept of refrigeration and refrigerants.

- Describe the operation of compression and absorption refrigeration systems, as well as the operational and safety controls.
- Heating Ventilating and Air Conditioning
  - Explain various heating and cooling solutions used in building as well as distribution, filtering, and humidification.
- Heating and Cooling Systems
  - Describe the operating principles of various heating systems including steam and hot water.
  - Describe central, Unitary, and Combined HVAC systems.
- Types of Plants
  - Identify steam-related processes in some common types of plants that employ Power Engineers.

## TRANSFERABILITY:

Nontransferable, there are no transfer agreements in place.

## EVALUATIONS:

PanGlobal Quizzes

Unit Exams

Final Exam

| Alpha Grade | 4-point Equivalent | Percentage Guidelines |  | Alpha Grade | 4-point Equivalent | Percentage Guidelines |
|-------------|--------------------|-----------------------|--|-------------|--------------------|-----------------------|
| A+          | 4.0                | 94-100                |  | C+          | 2.3                | 68-71                 |
| A           | 4.0                | 89-93                 |  | C           | 2.0                | 64-67                 |
| A-          | 3.7                | 84-88                 |  | C-          | 1.7                | 60-63                 |
| B+          | 3.3                | 80-83                 |  | D+          | 1.3                | 55-59                 |
| B           | 3.0                | 76-79                 |  | D           | 1.0                | 50-54                 |
| B-          | 2.7                | 72-75                 |  | F           | 0.0                | 00-49                 |

## COURSE SCHEDULE/TENTATIVE TIMELINE:

February 26, 2024 – March 29, 2024

## STUDENT RESPONSIBILITIES:

Students must be prepared to pre-read chapters and objectives prior to them being covered in class. Students must also be prepared to complete the online quizzes at the same time as the chapters are covered and other Instructor assigned assignments during out of class time. Students must complete all courses with no failing grades and a minimum of 67% and attend a minimum of 80% of all classes and 100% of labs to successfully complete the program.

## STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

\*\*Note: all Academic and Administrative policies are available on the same page.

## Additional Information:

Instructors may include additional information here. Delete this section if not required.