NORTHWESTERN POLYTECHNIC

**SCHOOL OF BUSINESS AND EDUCATION- DEPARTMENT OF ACADEMIC UPGRADING**
**COURSE OUTLINE Fall 2025**

**MA0132 (A2): Mathematics Grade 12 Equivalent (Principles 30-2)– 5 (6-0-0) HS**

**90 Hours for 15 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.


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|---|---|---|---|
| **INSTRUCTOR:** | Sheryl Heikel | **PHONE:** | Office: 780–539–2059 |
| **OFFICE:** | C417 | **E-MAIL:** | sheikel@nwpolytech.ca |
| **OFFICE HOURS:** | Wednesday 1:00-2:00pm OFFICE C417 or<br>Friday 11:30-12:30 J103 (please email to book this time) | | |


**CALENDAR DESCRIPTION:**

This course explores set theory, counting methods, probability, rational expressions and equations, and functions (polynomial, exponential, logarithmic and sinusoidal).

**PREREQUISITE(S):**

- Complete 1 of the following:
    - MA0120 - Mathematics Grade 20-1 Equivalent (5)
    - MA0122 - Mathematics Grade 12 Equivalent (Principles 20-2) (5)
    - Equivalent course, or equivalent math placement test score, or Math 20-1, or 60% or better in MA 20-2 within the previous two years

**COREQUISITE(S):** NA

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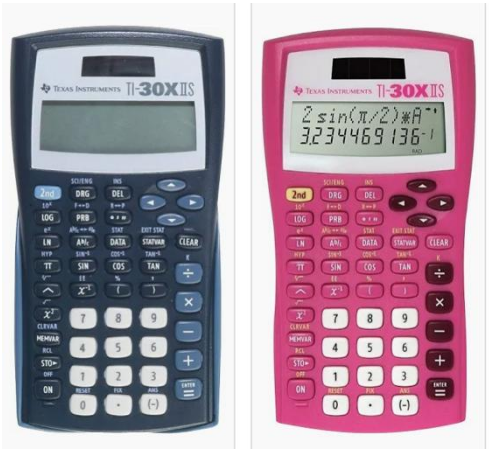
**REQUIRED MATERIALS:**




- iWrite Math Foundations of Mathematics Book 12 (Absolute Value Publications)
- graph paper 0.5cm grid
- NON-GRAPHING scientific calculator. If you are purchasing, **a TI-30X IIS is recommended.**
  Cost about $26 at Staples

**DELIVERY MODE(S):**

- On-campus (attend on-campus, in-person) – This type of course will be delivered on campus in a specific location which will be indicated on the student timetable. Students are expected to fully attend in person.
- Use of D2L (myClass) is required.
- Phone set up to receive NWP instructor emails https://www.nwpolytech.ca/information-technology/technical-support

**LEARNING OUTCOMES:**

As stated by Alberta Education, https://www.alberta.ca/programs-of-study#jumplinks-2 upon successful completion of this course the student will

- Develop logical reasoning.
- Develop critical thinking skills related to uncertainty. Probability
- Develop algebraic and graphical reasoning through the study of relations.

For additional detail see page 5 of this document.

**TRANSFERABILITY:**

Please consult the Alberta Transfer Guide for more information. You may check the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.alberta.ca.

** For courses with alpha (letter) grading, a grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**

**EVALUATIONS**: Course final grade will be based on the following components.

| | | |
|---|---|---|
| Section Tests | each 20% | 60% |
| Puzzles and Games Units | | 5% |
| Final Exam (Cumulative) | | 35% |

All tests and exams MUST be written at the scheduled times unless PRIOR arrangements have been made with the instructor. A missed test (exam) will result in a

score of ZERO on that test (exam). Only in very specific cases may student be given an opportunity to make up a missed exam (student will be presented with a different version of the exam). Doctor, lawyer, or police documentation may be required. The final exam is 3 hours long and is scheduled by the registrars' office during NWP Exam weeks. Do not book vacation at this time.

**GRADING CRITERIA**

Please note that most institutions will not accept your course for transfer credit **IF** your grade is **less than C-**.

| Alpha Grade | 4-point Equivalent | Percentage Guidelines | Alpha Grade | 4-point Equivalent | Percentage Guidelines |
|---|---|---|---|---|---|
| A+ | 4.0 | 95-100 | C+ | 2.3 | 67-69 |
| A | 4.0 | 85-94 | C | 2.0 | 63-66 |
| A- | 3.7 | 80-84 | C- | 1.7 | 60-62 |
| B+ | 3.3 | 77-79 | D+ | 1.3 | 55-59 |
| B | 3.0 | 73-76 | D | 1.0 | 50-54 |
| B- | 2.7 | 70-72 | F | 0.0 | 00-49 |

**COURSE SCHEDULE/TENTATIVE TIMELINE:**

Math 0132 will be divided into 4 Sections or Units – dates will be announced later

A. Logical Reasoning and Set Theory — 20%
Permutations and Combinations
Probability

B. Rational Expressions and Equations — 20%
Polynomial and Sinusoidal Functions

C. Exponential and Logarithmic Functions — 20%
Exponential and Logarithmic Applications

D. Puzzles and Games — 5%

**STUDENT RESPONSIBILITIES:**

Refer to the Polytechnic's Policy on Student Rights and Responsibilities at https://nwpolytech.ca/about/administration/policies/fetch.php?ID=69

MA0130 is required for many post-secondary programs. In taking this course, the primary goal is that students will develop their appreciation, understanding of and ability to use mathematics. Students in this course are also learning how to prepare for the demands and expectations of post-secondary education.

The Academic Upgrading Department is an adult education environment. Students are expected to show respect for each other as well as faculty and staff. Students are expected to participate fully in achieving their educational goals.

Certain activities are disruptive and not conducive to an atmosphere of learning. In addition to the *Student Rights and Responsibilities* as set out in the polytechnic calendar, the following guidelines will maintain an effective learning environment for everyone. We ask the cooperation of all students in the following areas of classroom environment:

1. Check **D2L** as well as **NWP email** on a regular basis.
2. **Attendance**: Regular attendance and class participation is expected of all students and is crucial to good performance in the course. Class interruption due to habitual late arrival or leaving early will not be permitted.
3. **Once in class** – remain in class. Leaving to get a coffee is disruptive for others. Any behavior that interferes with the learning of others is not acceptable.
4. Assignments must be submitted on time.
5. Exams must be written on the days announced in class.
6. If an emergency prevents attendance on an exam day, students must contact me before the end of the exam (as soon as possible) via phone or email, and may be asked to provide documentation to justify their absence.
7. No unspecified electronic devices will be permitted during exams.
8. Complete daily homework.

   **At least 1.5** hours of study per day outside of class time is required.
9. Take responsibility for your learning.
10. **Please communicate all requests regarding appointments, etc via email**. I am not always in my office and will often not receive a message in time.

**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 this page.

**DETAILED COURSE OBJECTIVES AND LEARNING OUTCOMES:**

As stated by Alberta Education,
https://education.alberta.ca/teachers/program/math/educator/progstudy/
upon successful completion of this course the student will be able to:

Develop logical reasoning.

1. Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies.
2. Solve problems that involve the application of set theory.

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Develop critical thinking skills related to uncertainty. Probability

1. Interpret and assess the validity of odds and probability statements.
2. Solve problems that involve the probability of mutually exclusive and non–mutually exclusive events.
3. Solve problems that involve the probability of two events.
4. Solve problems that involve the fundamental counting principle.
5. Solve problems that involve permutations.
6. Solve problems that involve combinations.

Develop algebraic and graphical reasoning through the study of relations.

1. Determine equivalent forms of rational expressions (limited to numerators and denominators that are monomials and binomials).
2. Perform operations on rational expressions (limited to numerators and denominators that are monomials and binomials).
3. Solve problems that involve rational equations (limited to numerators and denominators that are monomials and binomials).
4. Demonstrate an understanding of logarithms and the laws of logarithms.
5. Solve problems that involve exponential equations.
6. Represent data, using exponential and logarithmic functions, to solve problems.
7. Represent data, using polynomial functions (of degree ≤ 3), to solve problems.
8. Represent data, using sinusoidal functions, to solve problems.

**LEARNING OUTCOMES:**

After completing MA0132, students will be able to:

**Section 1** **Logical Reasoning and Set Theory** (text pages 1– 62)

- Use set notation and Venn diagrams.
- Determine the number of elements in a set.
- Determine the relationships between sets.
- Represent the intersection and union of two sets.
- Apply set theory to solve problems.
- Analyze puzzles and games (Part 1)

**Permutations and Combinations** (text pages 63 – 122)

- Apply the fundamental counting principle to determine the number of different ways to perform multi-step operations.
- Use factorial notation to determine permutations and combinations, or to solve for *n* or *r*.
- Determine the number of permutations of *n* different objects when all, or part, are used at a time.
- Determine the number of permutations of *n* objects when some of them are identical.
- Define combinations of *n* objects.
- Determine the number of different combinations when *r* objects are selected from *n* different objects.
- Apply the principle of combinations to different situations, and solve related problems.

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**Probability** (text pages 123 – 190)

- Distinguish between experimental and theoretical probability.
- Interpret odds and relate them to probability.
- Solve probability questions that involve permutations and combinations.
- Solve problems that involve mutually exclusive and non-mutually exclusive events.
- Solve problems that involve dependent and independent events.
- Analyze puzzles and games (Part 2)

**Section 2** **Rational Expressions and Equations** (text pages 417 – 498)

- Determine equivalent rational expressions.
- Determine non-permissible values.
- Perform operations with rational expressions: add, subtract, multiply and divide .
- Simplify rational expressions that require factoring of binomials.
- Solve rational equations.

**Polynomial and Sinusoidal Functions** (text pages 331 - 410)

- Identify characteristics of graphs of polynomial functions.
- Determine characteristics of graphs from the leading coefficient and constant term.
- Determine the best fit line for a set of data and use the function to solve a problem.
- Determine the curve of best fit for a set of data and use the function to solve problems.
- Sketch angles in degree and radian measure.
- Estimate the radian measure of an angle given the degree measure.
- Describe the characteristics of sinusoidal functions using their graphs and equations.
- Graph data for and model a situation using a sinusoidal function.
- Solve problems using sinusoidal function models.

**Analyze puzzles and games** (Part 3) (text pages 411 - 416)

**Section 3** **Exponential and Logarithmic Functions** (text pages 191 – 264)

**Exponential and Logarithmic Applications** (text pages 265 – 330)

- Use the equation of an exponential function to predict the characteristics of its graph and identify the graph.
- Solve exponential equations by using common bases and graphically.
- Solve problems modelled with exponential functions.
- Represent data using an exponential function and interpret the graph to solve problems.
- Solve loan, mortgage and depreciation problems using exponential functions.
- Determine the characteristics of logarithmic functions from an equation.
- Estimate and determine the values of logarithmic expressions.
- Understand and apply the laws of logarithms.
- Use logarithms to solve exponential equations.
- Mode
- l situations using logarithmic functions and interpret the models.
- **Analyze puzzles and games** (Part 4) p571 – 578