

## School of Liberal Arts



MATH 050  
Intermediate Algebra  
Fall 2024 (202401)

3 Credits

# Course Outline

<b>INSTRUCTOR</b>	Robert Ferro	<b>OFFICE HOURS</b>	TBA
<b>OFFICE</b>	A2303a	<b>CLASSROOM</b>	A2204
<b>E-MAIL</b>	<a href="mailto:rferro@yukonu.ca">rferro@yukonu.ca</a>	<b>CLASS TIME</b>	Mon to Fri, Sep 4 to Dec 13, 1:00-2:25 pm. Final exam Dec 18.
<b>TELEPHONE</b>	867.668.8841	<b>CRN</b>	10038
<b>Liberal Arts office:</b> Ayamdigut Campus A2501, liberalarts@yukonu.ca, 867-668-8770			

## COURSE DESCRIPTION

Intermediate Algebra consists of algebra and real numbers, solving equations and inequalities, graphs of equations and functions, trigonometry, systems of equations, polynomials and polynomial functions, rational expressions, equations and functions, radical expressions, equations and functions, quadratic equations and functions, and introductory statistics.

## COURSE REQUIREMENTS

Prerequisite(s): BC/Yukon Foundations of Mathematics and Pre-Calculus 10, Yukon University Math 051, Math 030 with a grade of B- (65%) or better. Students planning to enter Math 050 directly from Math 030 are strongly encouraged have a grade of A (86%) or better.

## EQUIVALENCY OR TRANSFERABILITY

Find course transfer at <https://www.bctransferguide.ca/transfer-options/high-school-transfer/adult-basic-education/>

Yukon University Math 050 is articulated as Advanced Level—Algebraic Mathematics in the Adult Basic Education system (ABE) in British Columbia and Yukon. For more information see the current year's publication "Adult Basic Education: A Guide to Upgrading in British Columbia's Public Post-Secondary Institutions, An Articulation Handbook."

ABE Advanced Level--Algebraic Mathematics is deemed equivalent to the British Columbia Ministry of Education course Pre-Calculus 11. For more information see "Adult Basic Education: A Guide to Upgrading in British Columbia's Public Post-Secondary Institutions, An Articulation Handbook" or chapter three of the British Columbia Ministry of Education's "Handbook of Procedures for the Graduation Program."

[https://www2.gov.bc.ca/assets/gov/education/administration/kindergarten-to-grade-12/graduation/handbook\\_of\\_procedures.pdf](https://www2.gov.bc.ca/assets/gov/education/administration/kindergarten-to-grade-12/graduation/handbook_of_procedures.pdf)

Receiving institutions determine course transferability. Find further information at:

<https://www.yukonu.ca/admissions/transfer-credit>

## LEARNING OUTCOMES

Math 050 covers the learning outcomes and core topics of Advanced Level—Algebraic Mathematics course of the Adult Basic Education program found in the 2024/2025 edition of the ABE Articulation Handbook at <https://www.bctransferguide.ca/transfer-options/adult-basic-education/past-abe-guides/>.

## COURSE FORMAT

### Delivery format

Lecture-based instruction: There will be five 85-minute classes per week. Course content will be covered primarily through lectures with the aid of a self-study textbook/workbook. The instructor sets the schedule, and a schedule will be provided.

### Workload

It is expected that this course will require three to four hours/week of homework and additional reading. It is important to note that the time required for successful course completion will vary by individual. The course will have homework assigned (not marked, but recommended), assignments, midterm exams and a final exam.

## EVALUATION

### Attendance and Participation

It is the student's responsibility to attend classes. Students who miss classes are responsible for any work missed.

### Assignments

An assignment will be submitted for each of the nine chapters covered in the course. The assignments account for 20% of the course mark.

Late assignments will be docked 10%; however, assignments cannot be accepted after they have been returned to the class. A student planning to be away on the due date must submit the assignment prior to leaving. If the due date is missed owing to an emergency, an alternate assignment may be given.

### Exams

There are three examinations in this course. There are two midterm examinations each worth 25% of the course mark and a final examination worth 30% of the course mark.

## Rewrites

A rewrite for a failing grade on an examination (less than 50%) may be permitted at the instructor's discretion. These examinations will be written no earlier than two weeks after the date of the original examination. The mark of the rewrite will be recorded whether it is higher or lower than the original; however, a maximum mark of 65% will be recorded.

## “No Shows”

A student who misses an examination will receive a mark of zero for that examination but may be permitted a rewrite. Exceptions may be made if a student receives prior permission from the instructor or faces an emergency. Some form of documentation of the emergency may be required.

## Course Evaluation (by category)

Midterm Exam 1	25 %
Midterm Exam 2	25 %
Final Exam	30 %
Assignments	20 %
<b>Total</b>	<b>100%</b>

## TEXTBOOKS & LEARNING MATERIALS

### Textbook

Bittinger, Marvin, et al, (2019). Intermediate Algebra (13th ed.)

### Materials

Writing paper, graph paper, ruler, pencils, and scientific calculator.

### Related Course Requirements

If a student plans to use the provision of Zoom classes, they will need to have access to a computer or other device and Internet to do their studies. The minimum specifications for a student device are as follows:

Requirement	Windows-based PC	Apple Mac/macOS-based PC
Operating System	Windows 10	macOS X
Web Browser	Firefox, Edge or Google Chrome	Firefox, Edge or Google Chrome
RAM/Memory	4 GB	4 GB
Storage	5 GB of available space	5 GB of available space

## COURSE WITHDRAWAL INFORMATION

Refer to the YukonU website for important dates: [www.yukonu.ca/admissions/important-dates](http://www.yukonu.ca/admissions/important-dates)

Last day to withdraw or change to audit from fall term academic courses without academic penalty is Monday, November 4, 2024.

## ACADEMIC INTEGRITY

Students are expected to contribute toward a positive and supportive environment and are required to conduct themselves in a responsible manner. Academic misconduct includes all forms of academic dishonesty such as cheating, plagiarism, fabrication, fraud, deceit, using the work of others without their permission, aiding other students in committing academic offences, misrepresenting academic assignments prepared by others as one's own, or any other forms of academic dishonesty including falsification of any information on any Yukon University document.

Please refer to Academic Regulations & Procedures for further details about academic standing and student rights and responsibilities.

## ACCESSIBILITY AND ACADEMIC ACCOMMODATION

Yukon University is committed to providing a positive, supportive, and barrier-free academic environment for all its students. Students experiencing barriers to full participation due to a visible or hidden disability (including hearing, vision, mobility, learning disability, mental health, chronic or temporary medical condition), should contact [Accessibility Services](#) for resources or to arrange academic accommodations: [access@yukonu.ca](mailto:access@yukonu.ca).

## TOPIC OUTLINE

### 1. Basic Algebra Review

It is expected that learners will be able to:

- Use roster and set builder notation to name sets and distinguish among various kinds of real numbers.
- Determine which of two real numbers is greater and indicate which using inequality notation.
- Graph inequalities on a number line.
- Find the absolute value of a real number.
- Add, subtract, multiply, and divide real numbers.

- Rewrite expressions with whole number exponents and evaluate exponential expressions.
- Rewrite expressions with or without negative integers as exponents.
- Simplify expressions using the rules for order of operations.
- Translate a phrase into an algebraic expression.
- Evaluate an algebraic expression by substitution.
- Determine whether two expressions are equivalent by completing a table of values, using commutative, associative, and distributive laws.
- Simplify expressions by collecting like terms and by removing parenthesis.
- Use exponential notation in multiplication and division.
- Use exponential notation in raising a power to a power, and in raising a product or quotient to a power.
- Convert between decimal notation and scientific notation and use scientific notation with multiplication and division.

## 2. Solving Linear Equations and Inequalities

It is expected that learners will be able to:

- Determine whether a given number is a solution of a given equation.
- Solve equations using the addition principle, the multiplication principle, or both.
- Evaluate formulas and solve formulas for a specified letter.
- Solve applied problems by translating to equations.
- Solve basic motion problems.
- Determine whether a given number is a solution of an inequality.
- Write interval notation for the solution set or graph of an inequality.
- Solve an inequality using the addition and multiplication principles and then graph the inequality.
- Find the intersection of two sets. Solve and graph conjunctions of inequalities.
- Find the union of two sets. Solve and graph disjunctions of inequalities.
- Solve applied problems involving conjunctions and disjunctions of inequalities.
- Simplify expressions containing absolute value symbols.

## 3. Graphs, Functions, and Applications

It is expected that learners will be able to:

- Plot points associated with ordered pairs of numbers.
- Determine whether an ordered pair of numbers is a solution of an equation.
- Graph linear equations using tables.
- Graph non-linear equations using tables.

- Determine whether a correspondence is a function.
- Given a function described by an equation, find function values for specified values.
- Draw the graph of a function.
- Determine whether a graph is that of a function using the vertical line test.
- Solve applied problems involving functions and their graphs.
- Find the domain and range of a function.
- Find the intercept of a line from the equation  $y = mx + b$  or  $f(x) = mx + b$ .
- Given two points on a line, find the slope; given a linear equation, derive the equivalent slope-intercept equation and determine the slope and the  $y$ -intercept.
- Solve applied problems involving slope.
- Graph linear equations using intercepts.
- Given a linear equation in slope-intercept form, use the slope and the  $y$ -intercept to graph the line.
- Graph linear equations of the form  $x = a$  or  $y = b$ .
- Given the equations of two lines, determine whether their graphs are parallel or perpendicular.
- Find the equation of a line when the slope and the  $y$ -intercept are given.
- Find the equation of a line when the slope and a point is given.
- Find the equation of a line when two points are given.
- Given a line and a point not on the given line, find an equation of the line parallel to the line and containing the point, and find an equation of the line perpendicular to the line and containing the point.
- Solve applied problems involving linear functions.
- Using a set of data, draw a representative graph of a linear function and make predictions from the graph.
- Using a set of data, choose two representative points, find a linear function using the two points, and make predictions from the function.

#### 4. Systems of Equations

It is expected that learners will be able to:

- Solve a system of two linear equations or two functions by graphing and determine whether a system is consistent or inconsistent and whether it is dependent or independent.
- Solve systems of equations in two variables by the substitution method.
- Solve systems of equations in two variables by the elimination method.
- Solve applied problems by solving systems of two equations using substitution or elimination.
- Solve applied problems involving total value and mixture using systems of two equations.

- Solve applied problems involving motion, using systems of two equations.
- Given total cost and total revenue functions, find the total profit function and the break-even point.
- Given supply and demand functions, find the equilibrium point.

## 5. Polynomials and Polynomial Functions

It is expected that learners will be able to:

- Identify the degree of each term and the degree of a polynomial; identify terms, coefficients, monomials, binomials, and trinomials; arrange polynomials in ascending or descending order; and identify the leading coefficient.
- Evaluate a polynomial function for given inputs.
- Collect like terms in a polynomial and add polynomials.
- Find the opposite of a polynomial and subtract polynomials.
- Multiply any two polynomials.
- Use the FOIL method to multiply two binomials.
- Use a rule to square a binomial.
- Use a rule to multiply a sum and a difference of the same two terms.
- For function  $f$  described by second-degree polynomials, find and simplify notation like  $f(a+h)$  and  $f(a+h) - f(a)$
- Factor polynomials whose terms have a common factor.
- Factor certain polynomials with four terms by grouping.
- Factor trinomials of the type  $x^2 + bx + c$ .
- Factor trinomials of the type  $ax^2 + bx + c$  by the FOIL method.
- Factor trinomials of the type  $ax^2 + bx + c$  by the grouping method.
- Factor trinomial squares.
- Factor differences of squares.
- Factor certain polynomials with four terms by grouping and possibly using the factoring of a trinomial square or the difference of squares.
- Factor sums and differences of cubes.
- Solve quadratic and other polynomial functions by first factoring and then using the principle of zero products.
- Solve applied problems involving quadratic and polynomial equations that can be solved by factoring.

## 6. Rational Expressions, Equations, and Functions

It is expected that learners will be able to:

- Find all numbers for which a rational number is undefined or that are not in the domain of a rational function.
- Simplify rational expressions.
- Multiply, divide, add and subtract rational expressions.
- Simplify complex rational expressions.
- Solve rational equations.
- Solve work problems and certain basic problems using rational equations.
- Solve applied problems involving proportions.
- Solve motion problems using rational equations.
- Solve a formula for a letter.
- Find an equation of direct, inverse, or other kinds of variation given values of the variables.
- Solve applied problems involving direct, inverse, or other kinds of variation.

## 7. Radical Expressions, Equations, and Functions

It is expected that learners will be able to:

- Find principal square roots and their opposites, approximate square roots, find outputs of square root functions, graph square root functions, and find the domains of square root functions.
- Simplify radical expressions with perfect square radicands.
- Find cube roots, simplifying certain expressions, and find outputs of cube root functions.
- Simplify expressions involving odd and even roots.
- Write expressions with or without rational exponents, and simplify, if possible.
- Write expressions without negative exponents, and simplify, if possible.
- Use the laws of exponents with rational exponents.
- Use rational exponents to simplify radical expressions.
- Multiply, divide, add or subtract, and simplify radical expressions.
- Multiply expressions involving radicals in which some factors contain more than one term.
- Rationalize the denominator of a radical expression having one or two terms in the denominator.
- Solve radical equations with one or two radical terms.
- Solve applied problems involving radical equations.
- Solve applied problems involving the Pythagorean Theorem and powers and roots.
- Express imaginary numbers as  $bj$ , where  $b$  is a nonzero real number, and complex numbers as  $a + bj$ , where  $a$  and  $b$  are real numbers.



## 8. Quadratic Equations and Functions

It is expected that learners will be able to:

- Solve quadratic equations using the principle of square roots and find the  $x$  intercepts of the graph of a related function.
- Solve quadratic equations by completing the square.
- Solve applied problems using quadratic equations.
- Solve quadratic equations using the quadratic formula, and approximate solutions using a calculator.
- Solve applied problems involving quadratic equations.
- Solve a formula for a given letter.
- Write a quadratic equation having two numbers specified as solutions.
- Solve equations that are reducible to quadratic.
- Graph quadratic functions of the type  $f(x) = a(x - h)^2 + k$ , finding the vertex, line of symmetry, and the maximum or minimum  $y$ -value.
- For a quadratic function given in the form  $f(x) = ax^2 + bx + c$ , find the vertex, the line of symmetry, and the maximum or minimum value, and graph the function.
- Find the intercepts of a quadratic function.
- Solve maximum minimum problems involving quadratic functions.
- Fit quadratic function to a set of data to form a mathematical model, and solve related applied problems.

## 9. Triangles and Applications

It is expected that learners will be able to:

- Determine the three trigonometric ratios for a triangle not in standard position.
- Solve right triangles.
- Solve problems involving the use of right triangles and the trigonometric functions.
- Use the law of sines to solve any triangle, given a side and two angles.
- Use the law of sines to solve triangles, given two sides and an angle opposite one of them, finding two solutions when they exist, and recognizing when a solution does not exist.
- Use the law of cosines, with the law of sines, to solve any triangle, given two sides and the included angle.
- Use the law of cosines to solve any triangle, given three sides.