

NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course Title: Introductory Algebra

Course # MAT*094

Course Description: 4 credits

This course includes a study of the basic properties and theorems of rational numbers, expressions and equations with polynomials, rational and radical expressions, integer exponents, linear equations in one and two variables, systems of linear equations in two variables, functions, and applications in geometry and algebra. *Credit does not fulfill degree requirements and is not transferable outside the Connecticut Community College system.*

Prerequisite: MAT* 075 with a "C" or better, or satisfactory scores on the math placement test.

Goals:

Students will:

1. Exhibit perseverance, ability, and confidence to use mathematics to make sense of and solve problems
2. Perform mental arithmetic and use proportional reasoning
3. Analyze problem situations through numerical, graphical, symbolic and/or verbal approaches and modeling
4. Use appropriate tools strategically in solving problems
5. Recognize patterns, draw inferences
6. Communicate and interpret results
7. Demonstrate an understanding and appreciation of the usefulness of mathematics in everyday life

Course Outcomes:

At the completion of MAT*094 students will be able to do the following:

Rational Numbers:

- a) Identify and distinguish between rational and irrational numbers
- b) Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2 , $\sqrt{8}$)

Expressions and Equations with Polynomials, Rational and Radical Expressions, and Integer Exponents:

- a) Interpret parts of an expression, such as terms, factors, and coefficients and evaluate expressions for a given replacement value(s)
- b) Add, subtract, and multiply polynomials. Divide polynomials by a monomial
- c) Construct and interpret equations as two expressions set equal to each other
- d) Manipulate formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's Law $V = IR$ to highlight resistance R

- e) Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = \frac{1}{3^3} = \frac{1}{27}$)
- f) Use square root symbols to represent solutions to equations of the form $x^2 = p$, where p is a positive rational number
- g) Evaluate square roots of perfect squares
- h) Know that numbers such as $\sqrt{2}$ are irrational
- i) Express very large or very small quantities in scientific notation
- j) Perform operations with numbers expressed in scientific notation

Linear Equations in One Variable:

- a) Solve linear equations and inequalities in one variable
- b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms
- c) Create linear equations and inequalities in one variable and use them to solve real world applications
- d) Recognize examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions

Linear Equations in Two Variables:

- a) Interpret the rate and unit rate as the slope of the graph
- b) Derive the equation $y = mx + b$ for a line intercepting the vertical axis at b and having a slope of m
- c) Identify parallel and perpendicular lines based on their slopes
- d) Graph a linear equation in two variables
- e) Construct a linear equation to model a linear relationship between two quantities. Determine and interpret the rate of change and initial value from a description of a relationship or from two (x, y) values, including reading these from a table or graph
- f) Construct linear equations given a graph, a description of a relationship, or two input-output pairs (include reading these from a table) using point-slope form and slope-intercept form

Systems of Linear Equations:

- a) Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs
- b) Solve systems of two linear equations in two variables algebraically (using both substitution and addition methods), graphically (by hand and/or technology), Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6
- c) Recognize systems of linear equations with one solution, infinitely many solutions, or no solutions
- d) Solve real-world problems leading to two linear equations in two variables

Functions:

- a) Understand that a function is a rule that assigns to each input exactly one output and that the graph of a function is the set of ordered pairs consisting of an input and the corresponding output
- b) Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line
- c) Use functions to model linear relationships between quantities
- d) Use function notation. Evaluate functions for inputs in their domains
- e) Graph linear functions and show intercepts
- f) Recognize that linear functions have a constant rate of change and interpret the rate of change in the context of the problem

Applications:

- a) Apply geometrical formulas for two and three-dimensional figures such as rectangles, circles, rectangular solids, cylinders, spheres, etc.
- b) Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two dimensions

College Policies

Plagiarism: Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanctions ranging from failure of the assignment (receiving a zero), failing the course, being removed/expelled from the program and/or the College. Please refer to your “Student Handbook” under “Policy on Student Rights,” the Section entitled “Student Discipline,” or the College catalog for additional information.

Americans with Disabilities Act (ADA): The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Dr. Christine Woodcock, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6318 and her email is cwoodcock@nwcc.edu.

School Cancellations: If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio and television stations and posted on the College’s website at www.nwcc.edu. Students may also call the College directly at **(860) 738-6464** to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.

Use of Electronic Devices: Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.

Sexual Assault and Intimate Partner Violence Resource Team: NCCC is committed to creating a community that is safe and supportive of people of all gender and sexual identities. This pertains to the entire campus community, whether on ground or virtual, students, faculty, or staff.

Sexual assault and intimate partner violence is an affront to our national conscience, and one we cannot ignore. It is our hope that no one within our campus community will become a victim of these crimes. However, if it occurs, NCCC has created the SART Team - Sexual Assault and Intimate Partner Violence Resource Team - to meet the victim's needs.

SART is a campus and community based team that is fully trained to provide trauma-informed compassionate service and referrals for comprehensive care. The team works in partnership with The Susan B. Anthony Project to extend services 24 hours a day, 7 days a week throughout the year.

The NCCC team members are:

Ruth Gonzalez, Ph.D.	860-738-6315	Green Woods Hall Room 207
Susan Berg	860-738-6342	Green Woods Hall Room 223
Kathleen Chapman	860-738-6344	Green Woods Hall Room 110
Michael Emanuel	860-738-6389	Founders Hall Annex Room 308
Seth Kershner	860-738-6481	Library
Jane O'Grady	860-738-6393	Founders Hall Annex Room 212
Robin Orlomoski	860-738-6416	Business Office Room 201
Patricia Bouffard, Ex-Officio	860-738-6319	Founders Hall Room 103
Savannah Schmitt		Student Representative

At NCCC we care about our students, staff and faculty and their well-being. It is our intention to facilitate the resources needed to help achieve both physical and emotional health.