NCBO Intermediate Algebra is the developmental mathematics co-requisite course designed to be completed with MATH 1314 College Algebra concurrently.

This is accomplished through developmental education interventions that use innovative learning approaches that, compared to traditional lecture-only classes, more effectively and efficiently prepare students to advance. This course specifically focuses on the concepts of Intermediate Algebra necessary for the student to complete College Algebra concurrently.

The course includes an in-depth study and application of relations and functions, inequalities, algebraic expressions and equations (absolute value, polynomial, radical, rational), with a special emphasis on linear and quadratic expressions and equations. This course will assist the student in developing the critical-thinking and problem-solving skills necessary for college level mathematics courses.

This course is required for students who have not achieved a passing score on the state-mandated placement examination. Students must be enrolled in a specific College Algebra Course (MATH 1314) concurrently.

II. LEARNING OUTCOMES

Upon successful completion of this course, NCBO Intermediate Algebra, the student will be able to:

A. Define, represent, and perform operations on real and complex numbers. (F1, F2, F8)

B. Recognize, understand, and analyze features of a function. (F3, F9)

C. Recognize and use algebraic (field) properties, concepts, procedures (including factoring), and algorithms to combine, transform, and evaluate absolute value, polynomial, radical, and rational expressions. (F3, F8, F9)
D. Identify, graph and solve absolute value, polynomial, radical, and rational equations. (F3, F9, F10)
E. Identify, graph and solve absolute value and linear inequalities. (F3, F9, F10)
F. Model, interpret and justify mathematical ideas and concepts using multiple representations. (F1, F2, F4, F5, F8, F9, F10, F12)
G. Connect and use multiple strands of mathematics in situations and problems, as well as in the study of other disciplines. (F3, F4, F5, F7, F8, F9, F10, F11, F12)
H. Use electronic and other media, such as the computer and DVD, to reinforce and supplement the learning process. (F1, F2, F3, F6)
I. Demonstrate critical thinking, communication, and empirical and quantitative skills. (F1, F3, F4, F7, F9)

Some learning outcomes are followed by letters and numbers; i.e., C9 or F11. These refer to SCANS foundations skills (F) and workplace competencies (C). View a chart showing these skills at http://www.ctcd.edu/scans. For more on the (Labor) Secretary's Commission on Achieving Necessary Skills, or SCANS, go to the U.S. Department of Labor site at http://wdr.doleta.gov/SCANS/.

III. INSTRUCTIONAL MATERIALS/RESOURCES

To assist in this course, a variety of materials both in and out of the classroom/laboratory will be required and used. The materials that you will need to purchase for this semester are listed at the following URL address:

http://www.ctcd.edu/books

***Required: Set of earphones for personal use in the lab.***

NOTE: A graphing calculator will be used in this course. It is recommended to use the Casio FX-9860 or the CASIO PRIZM fx-CG10.

IV. COURSE REQUIREMENTS

A. Assignments are given in My Labs (MML) and are due as scheduled by your instructor. The instructor will monitor students’ progress in completing the assignments.

B. Completion of a required number of hours in the computer lab and completion of all assignments are required for a student to be eligible to take the final examination and to achieve a passing grade in this course. The lab hour requirement will be completed in the computer lab outside of class time.
All lab hours must be completed by the end of the term. If a student fails to complete all required lab hours, he or she will not be allowed to take the final exam.

V. EXAMINATIONS AND ASSIGNMENTS

A. All assignments can be found in the course management system. Assignments will have specified deadlines to be completed and zeroes will be submitted following the due date.

B. During the co-requisite course, MATH 1314, periodic comprehensive unit examinations will be given during the course in order to evaluate a student's progress. Students may not "retake" any exam. No "early" finals, take-home or open-book examinations will be administered. No examination grades will be dropped.

C. If the student is absent from class or does not accumulate the required computer lab hours as instructed, it is his or her responsibility to contact his or her classmates/instructor to determine missed instruction. Each student must make appropriate arrangements to acquire assignments, announcements, lecture notes, and other pertinent information missed. Material on each class topic is available in the course management system. Students should use these resources to catch up on any missed lectures.

D. Class exams will be returned to students within three class periods after the test is administered.

VI. SEMESTER GRADE COMPUTATIONS

A. Students that are successful in this course will receive a grade of higher than a 70%. The same letter grade will be given in the paired credit bearing course.

B. Students that are not successful in the non-course-based-option will NOT be considered TSI Complete.

Final grades will follow the grade designation for developmental courses below:

- “A” – Weighted average of 90 – 100%
- “B” - Weighted average of 80 – 89%
- “C” - Weighted average of 70 – 79%
- “D” – Weighted average of 60 – 69%
- “F” – Weighted average of 0 – 59%
- “W” - Withdrawal from course (initiated by student)
Students may receive their grades through:

The CTC WebAdvisor (Online) System. Instructions for using the WebAdvisor Online Registration and Grades by computer are listed in the schedule bulletin.

*Grades will not be posted.*

### VII. NOTES AND ADDITIONAL INSTRUCTIONS

#### A. **Withdrawal from Course:** It is the student's responsibility to officially withdraw from a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or Application for Refund. The withdrawal form must be signed by the student.

An Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is as follows:

- **12 week session:** Friday of the 9th week
- **10 week session:** Friday of the 7th week
- **8 week session:** Friday of the 6th week
- **6 week session:** Friday of the 4th week
- **5 week session:** Friday of the 3rd week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will receive the grade of "W" provided their academic performance is satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

Before withdrawing from any developmental course, the student should seek the advice of Guidance and Counseling so that the student does not initiate an action that would inadvertently have a negative repercussion on his/her enrollment or Financial Aid.

#### B. **Cellular Phones and Pagers:** Cellular phones and pagers must be turned off while the student is in the classroom or laboratory.
C. **American’s With Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

D. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

E. **Office Hours:** Full-time instructors post their office hours outside their office doors. Part-time instructors may be available by appointment. Please feel free to see your instructor should you find yourself having difficulties with this course.

### VIII. COURSE OUTLINE

**A. Introductory Unit:** **Linear and Polynomial Functions**

1. **Unit Objectives:** Upon successful completion of this unit the student will be able to do the following:
   a. Define the rectangular coordinate system and plot ordered pairs of numbers
   b. Formulate whether an ordered pair is a solution of an equation in two variables
   c. Calculate the missing coordinate of an ordered pair solution, given one coordinate of the pair
   d. Identify linear equations
   e. Construct a graph of a linear equation by finding and plotting ordered pair solutions.
   f. Identify intercepts of a graph
   g. Identify and graph vertical and horizontal lines
   h. Calculate the slope of a line given two points of the line
   i. Identify the slope of a line given its equation
   j. Identify the slopes of horizontal and vertical lines
   k. Interpret slope as a rate change
   l. Construct a graph of linear equations using the slope-intercept form.
   m. Write an equation of a line using slope-intercept form.
   n. Write an equation of a line using the point-slope form to find given its slope and a point on the line.
Write an equation of a line using the point-slope form to find given two points of the line.

Apply the General Strategy for Solving Linear Equations

Solve Equations Containing Fractions and Decimals.

Recognize Identities and Equations with No Solution

Collect all the rules and definitions for exponents to simplify exponential expressions

Apply knowledge to simplify expressions containing negative exponents

Define linear and polynomial functions

Demonstrate ability to add and subtract polynomials

Demonstrate ability to use distributive property to multiply polynomials

Demonstrate ability to square a binomial

2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Lab/Computer Tutor

A. Unit One: Factoring Polynomials

1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Find the Greatest Common Factor of a List of Integers
   b. Find the Greatest Common Factor of a List of Terms
   c. Factor Out the Greatest Common Factor from a Polynomial
   d. Factor a Polynomial by Grouping
   e. Factor trinomials of the form \(x^2 + bx + c\)
   f. Factor trinomials of the form \(x^2 + bx + c\)
   g. Factor trinomials of the form \(ax^2 + bx + c\)
   h. Factor trinomials of the form \(ax^2 + bx + c\) where \(a \neq 1\)
   i. Factor Out a GCF Before Factoring a Trinomial of the form \(ax^2 + bx + c\)
   j. Factor a perfect square trinomial
   k. Use the Grouping Method to Factor Trinomials of the Form \(ax^2 + bx + c\)
   l. Factor the difference of two squares
   m. Factor the sum or difference of two cubes
   n. Solve Quadratic Equations by Factoring
   o. Solve Equations with Degree Greater than 2 by Factoring
   p. Find the \(x\)-intercepts of the Graph of a Quadratic Equation in Two Variables
   q. Solve Problems That Can Be Modeled By Quadratic Equations.
2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Lab/Computer Tutor

B. Unit Two: Rational Expressions
1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Find the domain of a rational expression
   b. Simplify or write rational expressions in lowest terms
   c. Use Rational Functions in Applications
   d. Multiply rational expressions
   e. Divide rational expressions
   f. Solve equations containing rational expressions

2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Lab/Computer Tutor

C. Unit Three: Rational Exponents, Radicals, and Complex Numbers
1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Find square roots
   b. Approximate roots
   c. Find cube roots
   d. Find \( n \)th roots
   e. Find \( \sqrt[n]{a} \) where \( a \) is a real number
   f. Graph square and cube root functions
   g. Understand the meaning of \( a^{\frac{1}{n}} \)
   h. Understand the meaning of \( a^{\frac{m}{n}} \)
   i. Understand the meaning of \( a^{-\frac{m}{n}} \)
   j. Use rules for exponents to simplify expressions that contain rational exponents
   k. Use rational exponents to simplify radical expressions
   l. Simplify radicals
   m. Add or subtract radical expressions
   n. Multiply radical expressions
   o. Solve equations that contain radical expressions
   p. Use the Pythagorean theorem to model problems
   q. Write square roots of negative numbers in the form \( bi \)
2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Lab/Computer Tutor

D. Unit Four: Quadratic Equations and Functions

1. Unit Objectives: Upon successful completion of this unit the student will be able to do the following:
   a. Use the square root property to solve quadratic equations
   b. Use quadratic equations to solve problems
   c. Solve quadratic equations by using the quadratic formula
   d. Determine the number and type of solutions of a quadratic equation by using the discriminant
   e. Solve problems modeled by quadratic equations
   f. Solve various equations that are quadratic in form
   g. Solve problems that lead to quadratic equations
   h. Solve polynomial inequalities of degree 2 or greater
   i. Solve inequalities that contain rational expressions with variables in the denominator
   j. Graph quadratic functions of the form \( f(x) = x^2 + k \)
   k. Graph quadratic functions of the form \( f(x) = (x - h)^2 \)
   l. Graph quadratic functions of the form \( f(x) = (x - h)^2 + k \)
   m. Graph quadratic functions of the form \( f(x) = ax^2 \)
   n. Graph quadratic functions of the form \( f(x) = a(x - h)^2 + k \)
   o. Write quadratic functions of the form \( y = a(x - h)^2 + k \)
   p. Derive a formula for finding the vertex of a parabola
   q. Find the minimum or maximum value of a quadratic function

2. Learning Activities:
   a. Classroom lecture/discussion
   b. Reading/homework assignments
   c. Computer Lab/Computer Tutor