1.      **COURSE TITLE\*:**   College Algebra

2.      **CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: MATH 1141**

3.      **PREREQUISITES\*:**
        Student must meet one of the following criteria to register for this course:
        - MATH 1118 with a B or higher;
        - Students with a C in MATH 1118 must meet with an advisor before registering;
        - Three High school STEM or Core Math courses with grades A, A, B or higher;
        - ACT Math Score of 22 or higher;
        - SAT Math Score of 530 or higher;
        - QAS Placement Test with a score of 263 or higher and Algebra 2 with a B or higher;
        - AAF Placement Test with a score of 263 or higher;
        **COREQUISITE(S)\*:**

4.      **COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**

5.      **CREDIT HOURS\*:**   4                    **LECTURE HOURS\*:**  4
        **LABORATORY HOURS\*:**   0              **OBSERVATION HOURS\*: 0**

6.      **FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***

7.      **COURSE DESCRIPTION\*:**

        This course emphasizes the use of algebra and functions in problem solving and modeling. Appropriate use of technology and applying mathematics to real-world situations is emphasized.  Topics include linear, quadratic, polynomial, rational, radical, exponential, logarithmic, and piecewise equations and functions.  Students whose programs recommend a college algebra course or who need to prepare for calculus should take this course.

8. **LEARNING OUTCOMES*;**

    At the completion of this course the student will be able to:

1.  Model application problems and data with linear, quadratic, radical, rational, exponential, piecewise defined, and logarithmic functions, find approximate and exact answers.
2.  Solve polynomial, radical, rational, absolute value, piecewise defined, exponential, and logarithmic equations
3.  Solve linear and nonlinear inequalities including absolute value.
4.  Find a quadratic equation given a graph of its parabola.
5.  Test equations for symmetry both algebraically and graphically.
6.  Identify intercepts, vertex, axis of symmetry, and extrema of a parabola and determine whether the quadratic equation results in a maximum or minimum.
7.  Perform operations with complex numbers and solve quadratic equations in the complex number system.
8.  Write equations of circles in both standard form and general form and graph the equation of a circle.
9.  Construct models using direct, inverse, and joint variation.
10. Determine whether or not a relation is a function.
11. Represent functions numerically, graphically, and algebraically.
12. Use functional notation and find values using functional notation.
13. Find and interpret the difference quotient of a function.
14. Obtain information from or about the graph of a function.
15. Identify properties of functions including: intercepts, domain, range, intervals where it is increasing or decreasing, vertex, asymptotes, one to one, extrema, and end behavior.
16. Perform operations including addition, subtraction, multiplication, division, and composition with functions.
17. Create linear models from data and interpret slope as a rate of change.
18. Graph polynomial, radical, rational, absolute value, piecewise defined, exponential, and logarithmic functions
19. Analyze piecewise defined functions.
20. Graph functions by transformations using shifting, reflecting, stretching, and shrinking.
21. Identify polynomial functions, their degrees, their real zeroes, and their multiplicity.
22. Find properties of rational functions including domain, range, intercepts, and asymptotes and graph rational functions.
23. Use Long division to divide polynomials, apply the Remainder and Factor Theorem, and find zeros of polynomial functions.
24. Convert between logarithmic and exponential forms of an equation and apply properties and laws of logarithms
25. Find inverses of a function and recognize relationships between a function and its inverses.
26. Solve system of equations by graphing, elimination and/or substitution

9.     **ADOPTED TEXT\*:**

*Algebra & Trigonometry*
*12th Edition,*
Sullivan.
Pearson, 2025 (Published 2024)
ISBN for Follett Inclusive Access: 9780138251338
ISBN for students who do not want Inclusive Access (eText): 9780138251550
ISBN for students who do not want Inclusive Access (Print): 97880138251406

OR

Algebra and Trigonometry 2e
OpenStax – Open Resource Textbook
Download for free at: https://openstax.org/details/books/algebra-and-trigonometry-2e

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

10.    **OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***

Students must have a scientific calculator, but they may not use any calculator that is classified as a symbolic manipulator.

11.    **GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog.  The scale is as follows:
      A:  90 – 100
      B:  80 – 89
      C:  70 – 79
      D:  60 – 69
      F:  0 – 59

12.    **GRADING PROCEDURES OR ASSESSMENTS:** (*Course Syllabus – Individual Instructor Specific)*

| Example 1 - By Percent | |
|---|---|
| Homework | 10% |
| Quizzes/Tests | 90% |
| Total | 100% |

| Example 2 | | |
|---|---|---|
| *Category* | *By Total Points* | *% of Grade* |
| Homework (20x10) | 200 | 10% |
| Quizzes/Tests (5x360) | 1800 | 90% |

| Total | 2000 | 100% |
|---|---|---|

| Example 3 | | |
|---|---|---|
| *Category* | *By Total Points* | *% of Grade* |
| Online Quizzes | 400 | 100% |
| Online Tests (6x100) | 600 | 15% |
| Notebook (2x500) | 1000 | 25% |
| Midterm | 1000 | 25% |
| Final | 1000 | 25% |
| Total | 4000 | 100% |

## 13. COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)*

The course design provides instruction and materials to support the course objectives. Classes may consist of a variety of means to accomplish this including but not limiting to: lectures, class discussions, small group projects, supplemental materials, and outside assignments. Practice is an important part of the learning process. For every one hour of class time, two to three additional hours of study time should be expected.

## 14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)*

### Chapter R: Review
| | | |
|---|---|---|
| R.1 | Real Numbers | (Review as needed) |
| R.2 | Algebra Essentials | (Review as needed) |
| R.3 | Geometry Essentials | (Review as needed) |
| R.4 | Polynomials | (Review as needed) |
| R.5 | Factoring Polynomials | (Review as needed) |
| R.6 | Synthetic Division | (Review as needed) |
| R.7 | Rational Expressions | (Review as needed) |
| R.8 | nth Roots; Rational Exponents | (Review as needed) |

### Chapter 1: Equations and Inequalities - LO1, 2, 3, and 7
| | | |
|---|---|---|
| 1.1 | Linear Equations | (Review as needed) |
| 1.2 | Quadratic Equations | |
| 1.3 | Quadratic Equations in the Complex Number System | |
| 1.4 | Radical Equations; Equations Quadratic in Form; Factorable Equations | |
| 1.5 | Solving Inequalities | (Review as needed) |
| 1.6 | Equations and Inequalities Involving Absolute Value | |
| 1.7 | Applications: Interest, Mixture, Uniform Motion, Constant Rate Jobs (Minimum of two types) | |

## Chapter 2:  Graph  -  LO5, 6, 7, 8, 9, and 18

| | | |
|---|---|---|
| 2.1 | Distance and Midpoint Formulas | (Review as needed) |
| 2.2 | Graphs of Equations; intercepts; symmetry | |
| 2.3 | Lines | (Review as needed) |
| 2.4 | Circles | optional |
| 2.5 | Variation | optional |

## Chapter 3:  Functions and Their Graphs - LO1, 10, 12, 13, 14, 16, 17, 18, and 19

| | |
|---|---|
| 3.1 | Functions |
| 3.2 | The Graph of a Function |
| 3.3 | Properties of Functions |
| 3.4 | Library of Functions; Piecewise Functions |
| 3.5 | Graphing Techniques:  Transformations |
| 3.6 | Mathematical Models; Building Functions |

## Chapter 4:  Linear and Quadratic Functions - LO1, 4, and 5

| | | |
|---|---|---|
| 4.1 | Linear Functions and Their Properties | (Review as needed) |
| 4.2 | Building Linear Functions from Data | (Review as needed) |
| 4.3 | Quadratic Functions and their Properties | |
| 4.4 | Building Quadratic Models | |
| 4.5 | Inequalities Involving Quadratic Functions | Optional |

## Chapter 5:  Polynomial and Rational Functions - LO3, 18, 21, and 22

| | |
|---|---|
| 5.1 | Polynomial Functions |
| 5.2 | Graphing Polynomial Functions; Models |
| 5.3 | Properties of a Rational Function |
| 5.5 | The Graph of a Rational Function |
| 5.4 | Polynomial and Rational Inequalities |
| 5.6 | The Real Zeros of a Polynomial Function |

## Chapter 6:  Exponential and Logarithmic Functions -  LO1, 2, 15, 16, 18, 24, and 25

| | |
|---|---|
| 6.1 | Composite Functions |
| 6.2 | Inverse Functions |
| 6.3 | Exponential Functions |
| 6.4 | Logarithmic Functions |
| 6.5 | Properties of Logarithms |
| 6.6 | Logarithmic and Exponential Equations |
| 6.8 | Exp. Growth and Decay:  Newton's Law; Logistic Models |

## Chapter 12:  Systems of Equations -  LO26

| | |
|---|---|
| 12.1 | Systems of Linear Equations: Substitution and Elimination |

Recommended course calendar:

Week 1:      Review, Chapter 1
Week 2:      Chapter 1
Week 3:      Chapter 2
Week 4:      Chapter 3
Week 5:      Chapter 3
Week 6:      Chapter 3
Week 7:      Chapter 4
Week 8:      Chapter 4
Week 9:      Chapter 5
Week 10:     Chapter 5
Week 11:     Chapter 5
Week 12:     Chapter 6
Week 13:     Chapter 6
Week 14:     Chapter 6
Week 15:     Chapter 12
Week 16:     **Finals**

15.   **SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**
16.   **FERPA: \***
      Students need to understand that their work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

17.   **ACCOMMODATIONS: \***
      Students requesting accommodations may contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431, X 2604.

      Students seeking a religious accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor and the Academic Affairs office with written notice of the specific dates for which the student requires an accommodation and must do so no later than fourteen (14) days after the first day of instruction or fourteen (14) days before the dates of absence, whichever comes first. For more information about Religious Accommodations, contact Ryan Hall, Accessibility Coordinator at rhall21@sscc.edu or 937-393-3431 X 2604.

18.   **OTHER INFORMATION\*\*\*:**

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**SYLLABUS TEMPLATE KEY**
**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

\*\*\*Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.