MA1175, College Algebra with Review

Credits 5 **Lab Hours** 0 **Lecture Hours** 5
Course Description
College Algebra involves the study of functions, graphing and solving problems using polynomial, rational, radical, exponential, and logarithmic functions. College Algebra is the first course in the college mathematics curriculum for mathematics and science majors and a general education requirement for most students. Success in college level mathematics courses begins with a good understanding of algebra and the goal of this course is to help the student develop that understanding. This course also includes review of foundational topics needed for the standard College Algebra outcomes. Many other programs recommend College Algebra or its level of competence for continued study leading to a related field.

For each unit of credit, a minimum of three hours per week with one of the hours for class and two hours for studying/ preparation outside of class is expected.

Program and/or Department Mission Statement
The Mathematics Department at Seward County Community College will enhance a student's ability to think critically using mathematical principles, ideas, and concepts in order to function in a society with ever-changing technology.

Academic Year AY2024-25

SCCC Outcomes
Outcome #4: Demonstrate mathematical skills by using a variety of techniques and technologies.

Outcome #5: Demonstrate the ability to think critically by gathering facts, generating insights, analyzing data, and evaluating information.

Course Outcomes
COURSE OUTCOMES: Expected learning outcomes of this course are in alignment with the learning objectives established by the Statewide Core Competencies.

Students will be expected to use appropriate technology as one tool to achieve the following outcomes:

<u>Analysis and Graphing of Functions and Equations</u>

1. Use functional notation.
2. Recognize and distinguish between functions and relations (equations).
3. Use concepts of symmetry, intercepts, left- and right-hand behavior, asymptotes, and transformations to sketch the graph of various types of functions (constant, linear, quadratic, absolute value, piecewise-defined, square root, cubic, polynomial, rational, exponential, and logarithmic) or relations (circle) given in description.
4. Determine the domain and range of a function.
5. Write the equation that describes a function (for types given above) or circle given its description.
6. Use graphs of functions for analysis.
7. Find arithmetic combinations and composites of functions.
8. Find the inverse of a function.

<u>Solutions of Equations and Inequalities</u>

9. Solve equations such as constant, linear, quadratic, absolute value, piecewise-defined, square root, cubic, polynomial, rational, exponential, and logarithmic, literal equations, i.e. quadratic equations by factoring and the quadratic formula, equations involving rational expressions, equations involving radicals, and equations involving absolute value expressions, along with equations involving exponential or logarithmic functions.
10. Solve inequalities of the following types: linear (in one and two variables), polynomial, rational, absolute value.
11. Solve systems of inequalities by graphing.
12. Apply equations such as constant, linear, quadratic, absolute value, piecewise-defined, square root, cubic, polynomial, rational, exponential, and logarithmic to real-world situations, including but not limited to depreciation, growth and decay, and max/min problems.

13. Examine and analyze data, make predictions/interpretations, and do basic modeling.
14. Solve systems of equations by various methods, including matrices.

Course Outline

1. Review on solving linear equations, linear inequalities and their applications.
2. Absolute value equations and inequalities.
3. Review of graphs and writing linear equations in two variables.
4. Function definition, identification, terminology, and notation. Determine domain and range from equations and graphs using interval notation.
5. Using technology to graph all functions discussed in the course.
6. Analytic Geometry formulas including distance formula, midpoint of a line segment, Pythagorean Theorem, and equation and graphs of circles.
7. Graphs and characteristics of functions including intervals where the function is increasing, decreasing, or constant, relative maxima, and relative minima.
8. Operations on functions, composite functions, and evaluate difference quotients.
9. Symmetry and transformations of functions.
10. Evaluate and graph piecewise functions.
11. Review on simplifying radical expressions including adding and subtracting like radicals, multiplying radical expressions, and using rational exponents.
12. Radical functions. Graph with and without the graphing calculator using transformations and finding domain and range.
13. Complex numbers: Adding, subtracting, multiplying, and complex conjugates.
14. Review of factoring: GCF, grouping, trinomial and special factoring.
15. Solving quadratic equations using factoring, completing the square, square root method, the quadratic formula and their applications.
16. Quadratic functions and their graphs with and without the graphing calculator, including finding the vertex (maximum or minimum), axis of symmetry, zeros, increasing and decreasing intervals, modeling and applications.
17. Review on solving radical equations.
18. Review of long and synthetic division with polynomials.
19. Polynomial functions. Graphical properties of third, fourth, and (n)th degree functions are considered including zeros (rational, irrational, and complex), increasing and decreasing intervals, maximum and minimum values, and end behavior. The Fundamental Theorem of Algebra is presented along with the Remainder Theorem, the Factor Theorem, and the Rational Zeros Theorem.
20. Simplifying rational expressions by adding and subtracting.
21. Solving rational equations
22. Rational functions. Graph by hand by finding asymptotes and intercepts.
23. Solving polynomial and rational inequalities.
24. Review exponent rules.
25. Exponential and Logarithmic Functions. Graphs, algebraic properties, solving equations, and applications.
26. Systems of equations with two or more variables and applications. Solve by various methods including matrices.
27. Review graphing of inequalities with two variables.
28. Solving systems of inequalities in two variables and their applications.

Instructional Methods

1. Lecture/Discussion
2. In class and out of class assignments
3. Calculator and computer exercises
4. Whiteboard drills
5. Calculator demonstrations
6. Quizzes and Examinations
7. Individual help

Instructional Resources and Materials

1. Textbook
2. Library mathematics reference books

3. Supplementary materials prepared by the instructor
4. Computer tutorial programs
5. Computer projector and laptop computer used for demonstrations
6. Graphing calculator
7. Peer tutoring available on campus

Methods of Assessment
Methods of assessing the general course outcomes and the specific course competencies include tests, daily quizzes, homework, and class attendance.

SCCC Outcome #4 will be assessed and measured by homework, quizzes, tests, and use of a graphing calculator.

SCCC Outcome #5 will be assessed and measured using assignments, tests, and nontraditional problem-solving activities.

SCCC Policy

Academic Calendar
View the Academic Calendar

Final Exams
View the Final Exam Schedule

Academic Integrity
View the Honor Code Policy

Technical Help
Technical support is available by contacting the SCCC IT Department at itech@sccc.edu

Canvas Help: canvashelp@sccc.edu

View Computer Minimum Requirements

Canvas Student Orientation

Americans with Disabilities Act (ADA) Statement
Under the Americans with Disabilities Act, Seward County Community College will make reasonable accommodations for students with documented disabilities. If you need support or assistance because of a disability, you may be eligible for academic accommodations. Students should identify themselves to the Mental Health Counselor at 620-417-1106 or go to the Student Success Center in the Hobble Academic building, room A149.

Reviewed Date
Tue, 04/22/2025 - 12:00