

Lassen Community College Course Outline

MATH 24 College Algebra for Liberal Arts

3.0 Units

I. Catalog Description

This is a college level course in algebra for majors in the Liberal Arts. The course will cover topics on functions, including polynomial, rational, radical, exponential, absolute value, and logarithmic functions. Solving various types of equations, linear systems, and their applications for problem solving will also be discussed and reflected upon. This course has been approved for hybrid, correspondence and online delivery. **It is recommended that students enroll into a math support lab for transferable math classes .**

Diversity Statement

Our commitment to diversity requires that we strive to eliminate barriers to equity and that we act deliberately to create a safe and inclusive environment where individual and group differences are valued and leveraged for the growth and understanding as an educational community.

Prerequisite(s): None.

Recommended Corequisite(s): Math support lab for transferable math.

Recommended Prep: Coursework equivalent to that of a traditional intermediate algebra course [Link to free algebra course:

<https://www.khanacademy.org/math/algebra2>

Prerequisite skills:

Before entering this course, the student should be able to:

1. Apply the real number properties to simplify expressions.
2. Add, subtract, multiply, divide, and factor polynomials.
3. Solve linear and quadratic equations.
4. Graph lines and use functional notation.
5. Solve systems of linear equations by the elimination, substitution, and graphing methods.
6. Add, subtract, multiply, and divide radical expressions.
7. Solve radical equations.
8. Add, subtract, multiply, and divide rational expressions.
9. Solve rational equations.

Additional Course Information

Transfer Status:

Total Number of Hours by Instructional Method:

- 51 Hours Lecture, 102 Out of Class Hours, 153 Total Hours of Instruction

Scheduled:

- Fall, Spring

II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

(Credit - Degree Applicable/Credit – Not Degree Applicable/Non-Credit)

TOP Code: 170100

III. Course Objectives

A. Course Student Learning Outcomes

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

1. Analyze properties of various function types.
2. Synthesize various types of functions.
3. Solve various equations and explain solution methods and concepts.
4. Solve systems of equations and describe applications.
5. Apply functions covered in course towards modeling real world applications.

B. Course Objectives

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

1. Analyze properties of various types of functions.
 - i) Recognize various types of functions, both linear and non-linear.
 - ii) Evaluate functions of various types, both linear and non-linear.
 - iii) Determine the domain and range of various functions.
2. Synthesize various types of functions.
 - i) Recognize important features of various types of functions, such as intercepts, symmetry, asymptotic behavior, vertices, etc.
 - ii) Utilize the algebra of functions to make new functions.
3. Solve various types of equations.
 - i) Solve polynomials by factoring.
 - ii) Solve exponential and logarithmic equations.
 - iii) Solve equations having complex solutions.
4. Solve various types of systems.
 - i) Solve systems of linear equations.
 - ii) Solve systems of linear inequalities.
 - iii) Solve non-linear systems of equations.
 - iv) Solve non-linear systems of inequalities.
5. Apply functions of various types to model real world applications.
 - i) Utilize linear models to solve application problems.
 - ii) Utilize polynomial models to solve application problems.
 - iii) Solve application problems involving exponential growth and decay

IV. Course Content

1. Equations, inequalities, and modeling
 - A. Solving equations in one variable
 - B. Constructing models to solve application problems (linear and non-linear)
 - C. Equations and graphs in two variables
 - D. Linear equations in two variables and their applications
 - E. Scatter diagrams and curve fitting
 - F. Quadratic equations and their applications
 - G. Solving linear and absolute value inequalities

2. Functions and their graphs
 - A. Concept of functions, function notation, and evaluation of functions
 - B. Graphs of relations and functions
 - C. Families of functions, transformations [*optional topic], and symmetry
 - D. Operations with functions (the algebra of functions)
 - E. Inverse functions [*optional topic]
 - F. Constructing functions using variation and principles of proportionality.

3. Polynomial and rational functions
 - A. Quadratic functions and inequalities
 - B. Zeros of polynomial functions [*optional topic]
 - C. Solving polynomial and rational equations
 - D. Solving miscellaneous equations
 - E. Graphs of polynomial functions
 - F. Rational functions and inequalities

4. Exponential and logarithmic functions
 - A. Exponential functions and their applications
 - B. Logarithmic functions and their applications
 - C. Properties of logarithms
 - D. Solving exponential and logarithmic equations
 - E. Applications of exponential and logarithmic functions

5. Systems of equations and inequalities
 - A. Systems of linear equations in two variables
 - B. Systems of linear equations in three variables
 - C. Nonlinear systems of equations
 - D. Inequalities and systems of inequalities in two variables
 - E. Modeling using linear programming [*optional topic]

6. Matrices and determinants [*optional topic]
 - A. Solving linear systems using matrices and determinants.
 - B. Solutions of linear systems in two variables using determinants
 - C. Solutions of linear systems in three variables using determinants

- 7. The conic sections [*optional topic]
 - A. The parabola
 - B. The ellipse and the circle
 - C. The hyperbola

- 8. Sequences and series [*optional topic]
 - A. Sequences
 - B. Series
 - C. Geometric sequences and series

- 9. Combinatorics and probability theory [*optional topic]

*The instructor must provide a substantial introduction to at least two of the optional topics in the course.

V. Assignments

A. **Appropriate Readings**

Students will be required to read and study the assigned chapters in textbook. Supplemental readings may be assigned that are appropriate for a specific topic.

B. **Writing Assignments**

1. Prepare for class and review material and concepts presented in class.
2. Complete homework assignments, including applications of representative symbol systems and/or work problems.
3. Understand and apply the theories and techniques taught in class.

C. **Expected Outside Assignments**

Students expected to spend a minimum of 2 hours outside of class in practice and preparation for each hour of class. Assignments may include: reading the text, application of formulas and theorems, and practice problems from the text.

D. **Specific Assignments that Demonstrate Critical Thinking**

Students will be required to interpret mathematical principles and techniques to solve broader and more difficult problems than those presented in class. Students will solve a variety of problems, including those that demand the application of principles in a number of different contexts. Multiple measures of student performance including in-class, out-of-class work, multiple exams and a final exam.

VI. Methods of Evaluation

List general evaluation methods (i.e., mixed format exams, participation, written essays, oral and listening exams)

Only include the appropriate evaluation modalities

Traditional Evaluation

Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

Correspondence Evaluation

Same as face to face with the exception of the desired use of proctored exams and exclusion of participation in classroom activities. Students will be expected to complete assignments and activities equivalent to in-class assignments and activities. Written correspondence and a minimum of six opportunities for feedback will be utilized to maintain effective communication between instructor and student.

Hybrid Evaluation

Quizzes and exams could be administered in person and/ or online. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

Online Evaluation

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications using the districts approved learning management system.

VII. Methods of Delivery

Check those delivery methods for which this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery

Correspondence Delivery

Hybrid Delivery

Online Delivery

Only include the appropriate delivery modalities

Traditional Classroom Delivery

Lecture, discussion, audio/visual aids, demonstration, group exercises, guest speakers, lab, individualized programs and other as needed.

Correspondence Delivery

Assigned readings, instructor-generated typed handouts, typed lecture materials, exercises and assignments equal to face to face instructional delivery. Written correspondence and a minimum of six opportunities for feedback will be utilized to maintain effective communication between instructor and student.

Hybrid Delivery

A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 17 hours, or 1/3 of the instruction hours, will be taught face-to-face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional class instruction could consist

of exercises/assignments, lectures, visual aids, practice exercises, exams and quizzes. Online delivery could consist of exercises/assignments, lecture posts, discussions, exams and quizzes, adding extra resources and other media sources as appropriate.

Online Delivery

A variety of methods will be used, such as: research papers, asynchronous and synchronous (chat/forum) discussions, online quizzes and exams, posting to online website and email communications using the districts approved learning management system.

VIII. Representative Texts and Supplies

1. Harshbarger & Yocco, College Algebra in Context, Pearson, 2020, ISBN-13: 9780136880899
2. Supplies: Scientific Calculator (minimal), Graphing Calculator (recommended), <https://ti89-simulator.com/> (free online graphing calculator), desmos.com (free online calculators), or equivalent technology software as required by instructor

IX. Course Status

1. Current Status: Proposed New Course
2. Original Approval Date: 05/21/2024
3. Course Originator: Travis Murphy
4. Board Approval Date: 06/14/2024
5. Chancellor's Office Approval Date:
6. Revised By:
7. Curriculum/Academic Standards Committee Revision Date: