

Lassen Community College Course Outline

MATH-8 Advanced Algebra

3.0 Units

I. Catalog Description

This course solidifies the basic foundation needed by students planning to study the analytic geometry and calculus sequence. Topics include: general theory of equations, polynomial and rational inequalities, conic sections, exponents and logarithms; an introduction to sequences, series, matrices and their applications. This course is recommended for math, science, engineering and business students. This course has been approved for correspondence, hybrid and online delivery.

Prerequisite(s): Math 60 Intermediate Algebra or equivalent multiple measures placement.

Prerequisite Skills: Before entering this course the student will 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.

Transfers to both UC/CSU

General Education Area: D2

CSU GE Area: B4

IGETC GE Area: 2A

51 Hours Lecture, 102 Outside Class hours, 153 Total Student Learning Hours

Scheduled: Spring

II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 170100

III. Course Objectives

A. Course Student Learning Outcomes

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

Solve problems involving logarithmic functions, exponential functions and conic sections using mathematical computational skills, intermediate algebra properties and rules and college algebra concepts.

B. Course Objectives

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

1. Calculate the domain, range, and inverse of a function.
2. Find the composition of two functions.
3. Know a catalogue of functions and use the concepts of symmetry, transformations, scaling, and reflections to graph functions.
4. Find the equations of linear and quadratic functions.
5. Apply the Remainder Theorem, Factor Theorem, and the Fundamental Theorem of Algebra to solve higher-degree equations.
6. Locate all asymptotes of a function; including vertical, horizontal, and oblique asymptotes.
7. Graph polynomial, rational, exponential, and logarithmic functions.
8. Use exponential and logarithmic properties to solve equations and application problems.
9. Categorize and graph conic sections from their equations.
10. Derive the equations of conic sections.
11. Solve systems of linear equations by matrix reduction (Gaussian method).
12. Calculate terms of arithmetic and geometric sequences.
13. Calculate the sums of arithmetic and geometric series.
14. Use the Binomial Theorem to expand a binomial.

IV. Course Content

- A. Functions: Transformations, domain, range, odd, even, distance formula, graphs, composite, inverse, and variation.
- B. Linear and Quadratic Functions: Linear and Quadratic functions, and inequalities; intersection points of two graphs.
- C. Polynomial and Rational Functions: Graphs, synthetic division, theory of equations, Remainder and Factor Theorems, Fundamental Theorem of Algebra, solutions to higher-degree equations and inequalities.
- D. Exponential and Logarithmic Functions: Graphs, properties of logarithms, exponential and logarithmic equations.
- E. Conic Sections: Circles, parabolas, ellipses, and hyperbolas.
- F. Systems of linear equations and matrix reduction (Gaussian method).
- G. Sequences and series: Arithmetic sequences and series, geometric sequences and series, factorial notation, and the Binomial Theorem.

V. Assignments

A. Appropriate Readings

Students will be required to read and study the assigned chapters in the textbook. Supplemental readings are generally not assigned, but may be assigned.

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 word 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, practice problems from the text, and assignments in the math lab.

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 final exam.

VI. Methods of Evaluation

Traditional Delivery Evaluation

Traditional measures of student performance, based on in-class work, out of class work, quizzes, exams, and a comprehensive final.

Hybrid Delivery Evaluation

All quizzes and exams will be administered during the in-person class time or by proctored exams 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 Delivery Evaluation

A variety of methods will be used, such as asynchronous and synchronous discussions (chat/forum), online quizzes and exams, online assignments and activities, postings to online website, and email communications.

Correspondence Delivery 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.

Web-enhanced Delivery Evaluation

Additional information and resources may be made available to students online. , and students may be required to do research and complete and/or submit assignments online. Quizzes may be administered online, but exams and summative assessments must be administered face-to-face.

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

Hybrid Delivery

Online Delivery

Correspondence Delivery

Traditional Classroom Course Delivery

Methods of instruction may include, but are not limited to lecture, discussion, questions and answers, demonstrations, and computer assisted instruction.

Correspondence Course 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 Course Delivery

A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 17 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 may consist of lecture, discussion, practice exercises/assignments, demonstrations, multimedia aids, and computer assisted instruction. Online delivery may consist of recorded lecture, discussion, practice exercises/assignments, demonstrations, multimedia aids, and computer assisted instruction with added extra resources and other media sources as appropriate.

Online Course Delivery

Online class instruction may consist of forum-based discussions, online practice exercises/assignments, web based video vignettes and lectures, email communications, postings to forums, online lecture notes and web links multimedia aids, and computer assisted instruction will compromise the method of instruction.

VIII. Representative Texts and Supplies

All Delivery Modalities

Required:

Lial, Hornsby, Schneider, Danials; *College Algebra*, 12th edition, 2017, Pearson Education. This textbook may be purchased in a cloth/paper bound version, ISBN: 978-0-134-217-451 or in a loose-leaf version, ISBN: 978-0-134-282-879, or as an eText version, ISBN 978-0-134-313-795 all without MyLab Math

When a Math 8 section requires the use of MyLab Math, the eText and MyLab may be purchased separately or as a bundle, ISBN 978-0-135-959-695 (18 week eTxt and MyLab access) or ISBN 978-0-134-282-886 (24 month eTxt and MyLab access).

IX. Discipline/s Assignment

Mathematics

X. Course Status

Current Status: Active

Original Approval Date: 5/8/1990

Revised By: Robert Schofield

Curriculum/Academic Standards Committee Revision Date: 05/17/2022