

# MATH 105: INTERMEDIATE ALGEBRA

## Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	5
Hours:	5 lecture per week (60 total per quarter)
Advisory:	Not open to students with credit in MATH 108.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

## Student Learning Outcomes

- Students will solve problems involving applications of linear, quadratic, exponential, and logarithmic growth.
- Students will develop conceptual understanding of the relationship between a function and its graph. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions, connecting concepts, and connecting multiple representations, as appropriate.
- Students will demonstrate the ability to simplify linear, quadratic, rational, radical, exponential, and logarithmic expressions and solve equations.

## Description

Quadratic, polynomial, rational, radical, exponential, and logarithmic functions and expressions with an emphasis on graphing and applications.

## Course Objectives

The student will be able to:

- Identify and graph inequalities, absolute value, rational, radical, polynomial, exponential, and logarithmic functions
- Simplify rational, radical, polynomial, exponential, and logarithmic expressions
- Solve both analytically and graphically inequalities, absolute value, rational, radical, polynomial, exponential, and logarithmic equations
- Use technology, such as graphing calculators and/or computer algebra system, to assist in solving problems involving any of the topics in (1) through (3)
- Discuss mathematical problems and write solutions in accurate mathematical language and notation
- Interpret mathematical solutions

## Course Content

- Identify and graph
  - Visually identify graphs of different functions
  - Inequalities
    - Inequality notation
    - Interval notation
    - Graphical notation
  - Absolute value
    - Domain and range
    - Notation
  - Rational functions
    - Domain and range
  - Radical function
    - Domain and range
  - Polynomials functions
    - Domain and range
    - Quadratic
      - Standard form
      - Vertex form
  - Exponential functions
    - Domain and range
    - Growth rate
  - Logarithmic function
    - Domain and range
    - Inverse function
- Simplify
  - Rational expressions
    - Factoring
    - Long division
    - Operations (add, subtract, multiple, and divide) on rational
  - Radical expressions
    - Conjugate
    - Properties of radical
    - Operations on radical
  - Polynomial expressions
    - Factoring
    - Completing the square
    - Operations on polynomials
  - Exponential expressions
    - Properties of exponents
    - Operations on exponents
  - Logarithmic expressions
    - Properties of logarithmic
    - Operations on logarithmic
- Solve both analytically and graphically
  - Linear inequalities
    - Single inequalities
    - Compound inequalities
  - Absolute value equations
  - Rational equations
    - Least common denominator
  - Radical equations
    - Power rule
  - Polynomial equations

- i. Zero product rule
  - ii. Quadratic formula
- f. Exponential equations
  - i. Similar bases
  - ii. Inverse
  - iii. Logarithmic properties
- g. Logarithmic equations
  - i. Inverse
  - ii. Converting to exponential
  - iii. Logarithmic property of equality
- 4. Use technology, such as graphing calculators and/or computer software, to assist in solving problems involving any of the topics in (1) through (3) above, such as:
  - a. Calculator/computer utilities for evaluating problems involving optimization
  - b. Calculator/computer utilities for determining mathematical models using regression
  - c. Calculator/computer utilities for finding intersection points for graphs of two functions
  - d. Calculator/computer utilities for finding zeros or roots of functions
- 5. Discuss mathematical problems and write solutions in accurate mathematical language and notation
  - a. Application problems from other disciplines
  - b. Proper notation
- 6. Interpret mathematical solutions
  - a. Explain the significance of solutions to application problems

## Lab Content

Not applicable.

## Special Facilities and/or Equipment

1. Access to graphing technology such as a graphing calculator or graphing software.
2. When taught online or hybrid: internet access, course management system, specific software related to the course.

## Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Homework  
 Quizzes  
 Hour exams  
 Proctored comprehensive final exam  
 Class participation  
 Project  
 Class activities

## Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture  
 Discussion  
 Cooperative learning exercises

## Representative Text(s) and Other Materials

Martinez and Seelbach. Intermediate Algebra, V5. 2021.

Bittinger, Marvin. Elementary and Intermediate Algebra + MyMathLab Package. 2012.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Homework problems covering subject matter from text and related material ranging from 30-60 problems per week. Students will need to employ critical thinking in order to complete assignments
2. Five hours per week of lecture covering subject matter from text and related material. Reading and study of the textbook, related materials, and notes
3. Student projects covering subject matter from textbook and related materials. Projects will require students to discuss mathematical problems, write solutions in accurate mathematical language and notation, and interpret mathematical solutions. Projects may require the use of a computer algebra system, such as Mathematica or MATLAB
4. Worksheets: problems and activities covering the subject matter. Such problems and activities will require students to think critically. Such worksheets may be completed inside and/or outside of class

## Discipline(s)

Mathematics