

College of San Mateo

Course Outline

- New Course
 Update/No change
 Course Revision (Minor)
 Course Revision (Major)

Date: 03/25/08

Department: Math Number: 122

Course Title: Intermediate Algebra I Units: 3

Total Semester Hours: Lecture: 48 Lab: 0 Homework: 96 By Arrangement: 16

Length of Course

- Semester-long
 Short course (Number of weeks____)
 Open entry/Open exit

Grading

- Letter
 Pass/No Pass
 Grade Option (letter or Credit/No Credit)

1. Prerequisite (Attach Enrollment Limitation Validation Form.)

Prerequisite: Satisfactory completion of MATH 110 with a grade of C OR higher or MATH 112 with a grade of C or higher OR appropriate score on the College Placement Test and other measures as appropriate.

2. Corequisite (Attach Enrollment Limitation Validation Form.)

none

3. Recommended Preparation (Attach Enrollment Validation Form.)

MATH 115 and READ 830

4. Catalog Description (Include prerequisites/corequisites/recommended preparation.)

INTERMEDIATE ALGEBRA I, MATH 122 Three lecture hours plus one hour by arrangement.
Prerequisite: Satisfactory completion of MATH 110 with a grade of C OR higher or MATH 112 with a grade of C or higher OR appropriate score on the College Placement Test and other measures as appropriate. Recommended Preparation: MATH 115 and READ 830. First half of Math 120, Intermediate Algebra: A comprehensive review of elementary algebra with certain topics studied in greater depth. Extension of fundamental algebraic concepts and operations, problem solving and applications, linear, quadratic, rational, and radical equations, equations in two variables, graphs, systems of equations, complex numbers, exponential and logarithmic functions, sequences and series. Math 122 and Math 123 together are equivalent to Math 120.

5. Class Schedule Description (Include prerequisites/corequisites/recommended preparation.)

INTERMEDIATE ALGEBRA, MATH 122
First half of Math 120, Intermediate Algebra: A comprehensive review of elementary algebra with certain topics studied in greater depth. Extension of fundamental algebraic concepts and operations, problem solving and applications, linear,

quadratic, rational, and radical equations, equations in two variables, graphs, systems of equations, complex numbers, exponential and logarithmic functions, sequences and series. Math 122 and Math 123 together are equivalent to Math 120.

Three lecture hours plus one hour by arrangement per week. Extra supplies may be required. Prerequisite: Satisfactory completion of MATH 110 with a grade of C OR higher or MATH 112 with a grade of C or higher OR appropriate score on the College Placement Test and other measures as appropriate. Recommended Preparation: MATH 115 and READ 830

6. Student Learning Outcomes (Identify 1-6 expected learner outcomes using active verbs.)

Along with course objectives listed below, students should be able to at a course appropriate level:

- SLO1. Solve Problems by application of arithmetic and algebraic principles.
- SLO2. Sketch graphs that illustrate applications of algebraic and geometric skills.
- SLO3. Write and interpret problems in written language, in symbolic form and in graphical form.
- SLO4. Select and apply appropriate formulas.
- SLO5. Organize work in a logical, clearly stated order, correctly using mathematical symbols and language.
- SLO6. Use calculators effectively and appropriately.
- SLO7. State solutions to application problems in the context of the problem and recognize inappropriate and/or impossible answers.
- SLO8. Follow and demonstrate understanding of mathematical exposition [text readings, handouts, and lecture.]
- SLO9. Recognize the usefulness of elementary mathematics

7. Course Objectives (Identify specific teaching objectives detailing course content and activities. *For some courses, the course objectives will be the same as the student learning outcomes. If this is the case, please simply indicate this in this section).*

Upon completion of both Math 122 and 123 the student should be able to:

- A. Identify and apply basic algebraic concepts including domain, range, slope, absolute value, scientific notation, equivalent equations, laws of exponents, intercepts, parallel lines, perpendicular lines, horizontal lines, and vertical lines;
- B. solve systems of linear equations in three unknowns using elimination and substitution
- C. solve equations and inequalities (optional) in one or two variables and involving absolute values (optional)
- D. solve quadratic equations by factoring, completing the square, and quadratic formula;
- E. solve exponential and logarithmic equations
- F. solve equations involving radicals
- G. perform basic operations on complex numbers (optional)
- H. find complex roots of a quadratic equation;
- I. sketch the graphs of functions and relations:
 - a. algebraic, including polynomial
 - b. logarithmic
 - c. exponential
 - d. circles
 - e. linear systems
- J. find and sketch inverse functions;
- K. problem solve by application of or modeling with linear, exponential, quadratic functions, rational functions or radical functions
- L. find the distance between two points and midpoints of line segments (optional)

8. **Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, you may attach a sample course syllabus with a timeline.)

Topics Introduced in Math 122

1: Linear Equations and Linear Functions

- a. Using Qualitative Graphs to Describe Situations
- b. Graphing Linear Equations
- c. Slope of a Line
- d. Meaning of Slope for Equations, Graphs, and Tables
- e. Finding Linear Equations
- f. Functions

2: Modeling with Linear Functions

- a. Using Lines to Model Data
- b. Finding Equations of Linear Models
- c. Function Notation and Making Predictions
- d. Slope Is a Rate of Change

3: Systems of Linear Equations

- a. Using Graphs and Tables to Solve Systems
- b. Using Substitution and Elimination to Solve Systems
- c. Using Systems to Model Data
- d. Value, Interest, and Mixture Problems
- e. Using Linear Inequalities in One Variable to Make Predictions

4: Exponential Functions

- a. Properties of Exponents
- b. Rational Exponents
- c. Graphing Exponential Functions
- d. Finding Equations of Exponential Functions
- e. Using Exponential Functions to Model Data

5: Logarithmic Functions

- a. Inverse Functions
- b. Logarithmic Functions
- c. Properties of Logarithms
- d. Using the Power Property with Exponential Models to Make Predictions
- e. More Properties of Logarithms
- f. Natural Logarithms (optional)

6: Optional topics

- a. Absolute Value: Equations and Inequalities
- b. Linear Inequalities in Two Variables; Systems of Linear Inequalities

9. **Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Include examples of out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills.) **If hours by arrangement are required by this course, indicate the additional instructional activity which will be provided during this time.**

- a. Out-of-class assignments: students will need to complete assigned problems and projects.
- b. Reading assignments: Instructor will assign text readings prior to discussion of a topic in class.

- c. Writing assignments:
 - a. Students will submit written homework assignments.
 - b. Students may be assigned papers including mathematical modeling.
 - d. Critical thinking:
 - a. Lecture/discussion to understand problem solving process
 - b. Students will practice critical thinking in small group problem solving
 - c. Students will evaluate proposed solutions in light of constraints of the problem
 - e. For this course, the hour by arrangement provides students with the opportunity to enrich their learning beyond class time through a number of activities and materials available in the Math Resource Center or through activities outside of the center.
 - a. The Math Resource Center provides: one-on-one tutoring, small group study sessions, access to student solutions manuals, computer based tutorials, on-line tutorials and WEB access, access to software used in the classroom, and directed study in area of difficulty or interest. The MRC records and reports student attendance using SARs and with sign-offs upon completion specific assignments as directed by instructors.
 - b. For some sections resources available on CD and the internet may be used to enhance learning.
 - c. Additional student instructor interaction may occur via blogs, email, phone "office hours" etc.
10. **Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)
- a. written individual assignments and/or journal- to demonstrate individual student progress toward objectives
 - b. small group presentations- to demonstrate student participation in problem solving process
 - c. written exams/quizzes - to reflect student knowledge of vocabulary, concepts, and application of concepts to problem solving as presented in lectures and discussion, small group sessions, and text readings.
 - d. Final Examination - to reflect student knowledge of vocabulary, concepts, and applications of concepts to problem solving as presented in lectures and discussions, small group sessions, and text readings.
 - e. participation - to reflect student involvement in class discussions, small group sessions and presentations, etc.

11. **Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)

Lehman, Jay. Intermediate Algebra, 3ed. Prentice-Hall: 2008.

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