

College of San Mateo

Course Outline

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

Date: 03/25/08

Department: Math Number: 123

Course Title: Intermediate Algebra II Units: 3

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

Length of Course

- Semester-long or short course of appropriate length
 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.)

MATH 122 with a grade of C or higher

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 II, MATH 123 Three lecture hours plus one hour by arrangement. Prerequisite: MATH 122 with a grade of C or higher. Recommended Preparation: MATH 115 and READ 830. Second 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 123
Second 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: MATH 122 with a grade of C or higher. 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 and reviewed as appropriate in Math 123

- 1: Linear Equations and Linear Functions
- 2: Modeling with Linear Functions
- 3: Systems of Linear Equations
- 4: Exponential Functions
- 5: Logarithmic Functions

Topics introduced in Math 123

6: Polynomial Functions

- a. Adding and Subtracting Polynomial Expressions and Functions
- b. Multiplying Polynomial Expressions and Functions
- c. Factoring Trinomials of the Form $x^2 + bx + c$; Factoring Out the GCF
- d. Factoring Polynomials
- e. Factoring Special Binomials; A Factoring Strategy
- f. Using Factoring to Solve Polynomial Equations

7: Quadratic Functions

- a. Graphing Quadratic Functions in Vertex Form
- b. Graphing Quadratic Functions in Standard Form
- c. Using the Square Root Property to Solve Quadratic Equations
- d. Solving Quadratic Equations by Completing the Square
- e. Using the Quadratic Formula to Solve Quadratic Equations
- f. Solving Systems of Linear Equations in Three Variables; Finding Quadratic Functions
- g. Finding Quadratic Models
- h. Modeling with Quadratic Functions

8: Rational Functions

- a. Finding the Domains of Rational Functions and Simplifying Rational Expressions
- b. Multiplying and Dividing Rational Expressions
- c. Adding and Subtracting Rational Expressions
- d. Simplifying Complex Rational Expressions
- e. Solving Rational Equations
- f. Modeling with Rational Functions
- g. Variation

9: Radical Functions

- a. Simplifying Radical Expressions
- b. Adding, Subtracting, and Multiplying Radical Expressions
- c. Rationalizing Denominators and Simplifying Quotients of Radical Expressions
- d. Graphing and Combining Square Root Functions (optional)
- e. Solving Radical Equations
- f. Modeling with Square Root Functions (optional)

10: Other

- a. Pythagorean theorem
- b. Performing Operations with Complex Numbers (optional)
- c. Distance Formula, and Circles (optional)
- d. Ellipses and Parabolas (optional)
- e. Solving Nonlinear Systems of Equations (optional)

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.)

- 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.

Prepared by:

Cheryl Gregory 27 March 2008
(Signature)