COURSE OUTLINE

Mathematics 120
Intermediate Algebra II for STEM

Catalog Statement

MATH 120 is the second course of a two-semester sequence of Intermediate Algebra. Topics include quadratic equations and inequalities, arithmetic and geometric sequences and series, the binomial theorem, conic sections, inverse functions, graphs of functions, systems of nonlinear equations and inequalities, and exponential and logarithmic functions. This course is equivalent to the second part of MATH 101. This course is preparation for students entering college algebra, precalculus, or business calculus.

Total Lecture Units: 1.0
Total Laboratory Units: 1.0
Total Course Units: 2.0

Total Lecture Hours: 16.0
Total Laboratory Hours: 48.0
     Total Laboratory Hours To Be Arranged: 0.0
Total Faculty Contact Hours: 64.0

Prerequisite: Placement is based on satisfactory completion of MATH 119 or MATH 219C.

Note: This course may not be taken for credit by students who have completed MATH 101 or 220A and 220B. A maximum of 5 units will be granted for MATH 101, 119, 120, 219A, 219B, 219C, 220A, and 220B. A maximum of 7 units will be granted for MATH 120, 220A, 220B, and 131. A maximum of 9 units will be granted for MATH 119 and 120 AND MATH 130.

Course Entry Expectations

Prior to enrolling in the course, the student should be able to:
- solve absolute value equations and inequalities;
- solve linear equations and compound inequalities;
- graph lines;
- perform operations with polynomials;
- simplify complex fractions;
- perform operations with radical expressions;
- simplify expressions with rational exponents;
- divide synthetically;
- solve rational equations;
- solve equations with radicals;
- find the equation of a line parallel or perpendicular to a given line;
- solve a system of linear equations using elimination, substitution, and Cramer's rule;

- solve systems of linear inequalities;
- find the composition of two functions;
- solve applied problems.

Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:
- solve absolute value equations and inequalities;
- solve linear equations and compound inequalities;
- perform operations with polynomials;
- simplify complex fractions;
- perform operations with radical expressions;
- simplify expressions with rational exponents;
- divide polynomials synthetically;
- solve rational equations;
- solve radical equations;
- find the equation of a line;
- solve a system of linear equations;
- solve systems of linear inequalities;
- find the composition of two functions;
- solve application problems;
- solve quadratic equations with real and complex solutions;
- find the inverse of a function;
- use the properties of logarithms to simplify and expand expressions;
- solve logarithmic and exponential equations;
- find the nth term of arithmetic and geometric sequences;
- find the sum of a finite series and an infinite geometric series;
- graph functions (linear, quadratic, exponential, logarithmic);
- graph conic sections centered at any point;
- solve a non-linear system;
- expand the power of a binomial.

Course Content   **Total Faculty Contact Hours = 64.0**
Review of Intermediate Algebra I **(2 lecture hours, 6 lab hours)**
   Equations and inequalities in one variable
   Lines and functions
   Systems of linear equations and inequalities
   Exponents and polynomials
   Rational expressions and functions
   Radicals and rational exponents
Quadratic Equations **(4 lecture hours, 12 lab hours)**
   Completing the square
   Quadratic formula
   The discriminant and its applications

      Equations quadratic in form
      Non-linear inequalities of one variable
Exponential and Logarithmic Functions **(4 lecture hours, 12 lab hours)**
      One-to-one functions
      Inverse functions
      Exponential functions
      Logarithmic functions
      Properties of logarithms
      Common and natural logarithms
      Exponential equations and change of base
      Solving logarithmic equations
      Applications
The Conic Sections **(3 lecture hours, 9 lab hours)**
      Parabolas
      Circles
      Ellipses and hyperbolas
      Second-degree inequalities
      Nonlinear systems of equations and inequalities
Sequences and Series **(3 lecture hours, 9 lab hours)**
      Sequences
      Series and summation notation
      Arithmetic progressions
      Geometric progressions
      The binomial expansion

Methods of Instruction

The following methods of instruction may be used in this course:
- classroom lecture and discussion;
- group work and discussion;
- online video lectures.

Out of Class Assignments

The following out of class assignments may be used in this course:
- homework (e.g. problems sets related to course content);
- reading assignments (e.g. study skills related to mathematics).

Methods of Evaluation

The following methods of evaluation may be used in this course:
- group work;
- quizzes;
- four to seven exams are required;
- a comprehensive final examination is required.

Textbooks

Tussy, Alan, and R. David Gustafson. *Intermediate Algebra:* Glendale Community College.
    5th ed. Boston: Cengage Learning, 2016.
8th Grade Textbook Reading Level. ISBN: 978-1-111-56767-5

Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:
- solve equations and inequalities (quadratic, exponential, logarithmic, systems);
- use the properties of logarithms to simplify exponential and logarithmic expressions;
- graph various functions and relations (linear, quadratic, exponential, logarithmic, conic sections);
- use mathematical models to solve application problems (exponential, logarithmic, sequences, series);
- apply the formulas of sequences and series (arithmetic, geometric, binomial).