OM012: Honors Intermediate Algebra Syllabus

Course Description
Honors Intermediate Algebra builds on the material from Honors Beginning Algebra. The course begins with a review of the real number system and solutions of linear equations and inequalities. Students learn to solve equations and inequalities involving absolute value. Following this, graphs of linear equations are reviewed and students learn additional material about functions and variation. After a review of solutions to 2x2 systems, students learn how to solve 3x3 and 4x4 systems of linear equations. Operations on polynomials, including factoring, are covered, along with rational expressions. Radical expressions are reviewed, and students learn to solve equations involving several radical expressions. Students learn to apply the quadratic formula to equations that are quadratic in type, and they investigate solutions to quadratic and rational inequalities. Beginning with a general study of inverse functions, students learn the basic properties of exponential and logarithmic functions and apply them to real-world problems. Finally, the course concludes with an introduction to arithmetic series, geometric series, and the binomial theorem.

Course Topics

- **Algebraic Expressions**
  The Real Number System, The Order of Operations, Properties of Real Numbers

- **Linear Equations and Inequalities**
  Linear Equations and Inequalities, Absolute Value Equations and Inequalities, Graphing Linear Equations, Relations, Functions, Variation

- **Systems of Linear Equations**
  Solving 2x2, 3x3 and 4x4 Systems of Equations with Applications

- **Polynomial Functions**
  Operations on Polynomials, Polynomial Long Division, Factoring, Special Factorizations, Solving Equations by Factoring, Applications

- **Rational Functions**
  Operations on Rational Expressions, Graphing Rational Functions, Applications

- **Radical Functions**
  Operations on Radical Expressions, Graphing Radical Expressions, Complex Numbers, Applications

- **Exponential and Logarithmic Functions**
  Inverse Functions, Exponential Functions, Exponential Equations, Logarithmic Functions, Evaluating Logarithms, Logarithmic Equations, Exponential Growth and Decay, The Change-of-base Formula

- **Additional Topics**
  Arithmetic Series, Geometric Series, The Binomial Theorem
Learning Objectives

Upon completion of Honors Intermediate Algebra, students will demonstrate proficiency in:

- Applying techniques related to the above topics to solve problems
- Understanding the nature of rigorous logical thinking
- Expressing mathematics clearly, in both written and oral communication
- Working creatively toward solutions to novel problems
- Understanding the qualitative differences between linear, polynomial, rational, logarithmic, and exponential functions as well as their typical applications

Key Assignments

Each semester, the letter grade in the course will be determined based on performance on the following types of assignments.

- **In class participation:** Students are expected to participate in in-class discussion sections, and are expected to have a functioning graphics tablet for presenting problems and asking questions during discussion sections. Students will contribute to and be part of an active learning environment.

- **Homework assignments:** Students will complete regular homework assignments (written and/or electronic) to demonstrate their mastery and knowledge of the material covered in each week’s lectures and discussion sections.

- **Written exams:** Students will complete written exams at the end of each major unit to test depth of understanding and the ability to integrate knowledge of course concepts to solve problems. Midterm and final exams: There will be comprehensive, proctored midterm and final exams each semester. These exams will include material covered in lecture, discussion, homework assignments, and exams.