

Mathematics Curriculum

Algebra I

Algebra I focuses on the theoretical concepts and essential problem solving skills needed in higher level mathematics and science courses. The course introduces students to abstract thought and logical structure while at the same time requiring students to apply the concepts they are learning to a variety of realistic situations. Graphing calculator technology is used as a tool to aid in the understanding and visualization of concepts throughout the course. Topics covered include real numbers, variables, expressions, equations, inequalities, problem solving strategies, coordinate plane and graphing on the coordinate plane, systems of linear equations, polynomials, rational expressions, factoring, solving quadratic equations, exponents, radicals, and functions. Note: Students who score below a "C-" for their second semester grade are required to receive summer remediation or to repeat this course before continuing in the mathematics sequence. TEXTBOOK: *Algebra I* (Glencoe, 2003)

Geometry

Geometry is an introductory course in inductive and deductive reasoning. Students learn many geometry terms and study Euclid's theorems and postulates which they apply when proving two figures congruent. Students are introduced to the Pythagorean Theorem, trigonometry, and circles. Throughout the course students learn to use Geometer's Sketchpad to make their own constructions which will deepen their understanding of the material. Students also learn the midpoint and distance formulas. They apply much of what was learned in Algebra I to solve various geometric problems. Area and volume of two and three dimensional figures and coordinate geometry are studied. The course is broad based but is essential for higher level mathematics courses as well as SAT and ACT tests. TEXTBOOK: *Discovering Geometry (4th edition)*

Algebra II

Algebra II builds upon the skills and concepts learned in Algebra I and also integrates reading, writing, and problem solving skills in order to prepare students for more in-depth study of mathematical concepts. Students develop proficiency in working with algebraic expressions, functional analysis, and coordinate geometry. Graphing calculator technology is integrated throughout the course to provide concrete visual aids in the study of abstract concepts as well as problem solving. Topics covered include equations and formulas, variation, linear equations and inequalities, systems of linear equations and inequalities, quadratic functions, functional analysis, exponential, radical, rational, and logarithmic functions. TEXTBOOK: *Algebra II: Integrations, Applications, Connections* (Glencoe, 2005)

Honors Algebra II

Honors Algebra II operates on a more rigorous, theoretical level and covers a broader range of topics and applications than the regular Algebra II course. Students should expect the course to move at a rapid pace and be prepared to study and learn concepts independently. All topics covered in Algebra II are covered in greater depth. Topics covered beyond those listed under Algebra II include analysis of trigonometric functions, logistic functions, and polynomial functions.

Prerequisites: Students who wish to enroll in Honors Algebra II must have at least a "B" average in both Algebra I and Geometry. Approval from the teachers in the Mathematics Department must also be secured.

TEXTBOOK: *Algebra II: Equations, Graphs, Applications* (McDougal-Littell, 2004)

Precalculus

This course bridges the Algebra II and Honors Precalculus curriculum by combining an in-depth study of Algebra II topics with those of an introductory Precalculus course. The course is intended to provide the necessary background for continued study in mathematics as well as further prepare students for the mathematics section of college entrance exams. Graphing calculator technology is integrated throughout the course as problems are presented both

algebraically and graphically. Topics covered include linear relations and functions, matrices, graphical analysis, trigonometric functions and their graphs and inverses, conic sections, exponential and logarithmic functions, sequences, and series.

TEXTBOOK: *Functions Modeling Change* (Wiley 2007)

Honors Precalculus

Honors Precalculus incorporates graphing technology throughout the course. Technology allows the focus of the course to be on problem solving and exploration while at the same time building a deeper understanding of advanced mathematical ideas and techniques. Concepts and problems are analyzed and discussed algebraically, graphically, verbally, and numerically. Topics covered include graphing, manipulating, and finding the solutions of linear, polynomial, exponential, logarithmic, rational, and trigonometric functions, complex numbers and polar equations, sequences and series, and discrete mathematics.

Prerequisites: Students who wish to enroll in Honors Precalculus must have at least a “B” average in Honors Algebra II or an “A” average in Algebra II. Approval from the teachers in the Mathematics Department must also be secured.

TEXTBOOK: *Functions Modeling Change* (Wiley 2007)

Calculus

Calculus is intended for students who have a thorough knowledge of college preparatory mathematics, including algebra, axiomatic geometry, trigonometry, and analytic geometry. It is a course in introductory calculus with elementary function. Topics covered include: functions and graphs, limits and continuity, differential calculus including applications such as graphing, integral calculus including applications such as finding areas under the curve. Problems are analyzed by using both an algebraic representation and a graphical, or geometric, representation of a problem.

Prerequisites: Students who wish to enroll in Calculus must have at least a “B” average in regular Precalculus. Approval from the teachers in the Mathematics Department must also be secured.

TEXTBOOK: *Calculus of a Single Variable* (Larson, Hostetler, Edwards, 2006)

Advanced Placement Calculus (AB Level)

Calculus (AB) is intended for students who have a thorough knowledge of college preparatory mathematics, including algebra, geometry, advanced algebra, functions, and trigonometry. Concepts and problems in the course are analyzed and discussed using a combination of algebraic, graphic, numeric, and verbal methods. Graphing calculator technology is integrated throughout the course. Topics covered include functions and graphs, limits and continuity, differential calculus and applications of derivatives, and integral calculus and applications of integration. All students are expected to take the AP Examination in May.

Prerequisites: Students who wish to enroll in AP Calculus must have at least a “B” average in Honors Precalculus. Approval from the teachers in the Mathematics Department must also be secured.

TEXTBOOK: *Calculus of a Single Variable* (Larson, Hostetler, Edwards, 2006)

Advanced Placement Calculus (BC Level)

AP Calculus BC is intended for students who have a thorough knowledge of college preparatory mathematics, including Algebra, Axiomatic Geometry, Trigonometry, and Analytic Geometry. It is a course in introductory calculus with elementary function. Topics covered include: limits and continuity, differential calculus including applications such as graphing, integral calculus including applications such as finding areas and volumes, a heavy concentration on series and sequences as well as conic sections, parametric equations and polar coordinates. Problems are analyzed by using both an algebraic representation and a graphical, or geometric, representation of a problem. The students are expected to take the AP examination in May.

Prerequisites: Students who wish to enroll in AP Calculus BC must have an “A” in Honors Precalculus and approval from the teachers in the Mathematics Department.

TEXTBOOK: *Calculus of a Single Variable* (Larson, Hostetler, Edwards, 2006)

Discrete Mathematics

This elective explores the mathematics used in designing computer systems. Major topics covered are logic, set theory, algorithm development, verification techniques, Boolean algebra, matrices, graph theory, and trees. Students must complete a year of Algebra II before taking this course.

TEXTBOOK: *Discrete Mathematics* (Wiley 2006)

Advanced Placement Statistics

Advanced Placement Statistics is an introductory college level statistics course. The focus of the course is on understanding statistical reasoning and practices rather than rote memorization of formulas and procedures. AP Statistics is built around four main themes: exploring data, planning statistical studies, modeling with probability and simulation, and using statistical inference. Technology is integrated around these themes through the use of graphing calculators and computer software (Minitab). Topics covered include basic numerical and graphical analysis of one and two variable data, introductory experimental and sampling designs, basic probability theory and probability models, estimation and tests of hypotheses, and using inference with probability distributions and simple linear regression.

Prerequisites: Students who wish to enroll in AP Statistics must have already successfully completed Honors Precalculus with at least a "B" average. Students who have successfully completed Precalculus with at least an "A-" average are also eligible for this course. In all cases, approval from the teachers in the Mathematics Department must also be secured. Students who wish to take AP Statistics concurrently with Honors Precalculus or AP Calculus must secure approval from the teachers in the Mathematics Department.

TEXTBOOK: *The Practice of Statistics* (Yates et al, Ed. 3, 2007)