

# Mathematics



## Philosophy Statement

The need to understand, apply, and communicate mathematics in everyday life has never been greater. A high quality mathematics education equips students with an understanding of the world around them and the capacity to be successful in it. Mathematics is a way of approaching new challenges through exploring, reasoning, visualizing, and problem solving with the goal of communicating the relationships observed and the problems solved.

The Mathematics Department is committed to empowering all students to think critically, reason effectively, and become problem solvers. The department is committed to providing curriculum, instruction, and assessment that foster these attributes in our students.

The department also believes that technology is an important tool that enhances student learning. While paper and pencil are still appropriate in many situations, the demands of an ever-changing technological world mandate that every student be a competent user of technology. Calculators and computers are widely used at home and in the workplace. Use of these devices in mathematics will match the realities of everyday life, develop students' reasoning skills, and promote the understanding and application of mathematics. The TI-84+ graphing calculator is required in all math courses except Computer Science. For more information, the department's calculator policy can be found in the student handbook or visit the math department link on the school website.

## Mathematics

### Course Descriptions

- It would be to the student's advantage to have earned a grade of "C" or better to advance to the next level.

## Advanced Algebra with Trigonometry and Statistics

*Course No.: 3002*

*Prerequisite: Intermediate Algebra II or Algebra II.*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Advanced Algebra with Trigonometry and Statistics** is a third year advanced algebra course. Students will study exponential and logarithmic functions, conic sections, central tendency, statistical graphs, dispersion, counting principle, probability, right triangle trigonometry, radian measure, circular functions, inverse circular functions, law of sines and law of cosines. The instruction is designed and paced in a way to help students both learn and retain mathematical concepts while connecting them to the real world.

## Advanced Math

*Course No.: 3004*

*Prerequisite: Algebra II Honors or Trigonometry. By department recommendation only, a student may take this course concurrently with semester 1 Trigonometry.*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Advanced Math** begins with a review of polynomial, trigonometric, logarithmic and exponential functions, and further explores their applications. Other topics include conic sections, polar curves, parametric equations, sequences and series, probability (including the Binomial Theorem), limits, and an introduction to calculus.

## Advanced Math Honors

*Course No.: 3006*

*Prerequisite: Algebra II Honors. The equivalent of a semester of Trigonometry is required to elect this course.*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Advanced Math Honors** begins with a review of polynomial functions and their applications. Other topics include analytic geometry, conic sections, polar curves, parametric equations, vectors, vector equations of the line and plane in two and three dimensions, dot and cross products and their applications. Combinatorics, probability, including the Binomial Theorem, sequence and series, limits and an introduction to calculus complete the course.

### **Advanced Math I**

*Course No.: 3008S*  
*Prerequisite: Trigonometry*  
*Credit: 0.5 / Semester 2 only*  
*Fees:*  
*Grades: 10, 11, 12*  
*Other: A TI-84+ graphing calculator is required.*

**Advanced Math I** includes the study of functions and their graphs. The course covers polynomial, rational, exponential, logarithmic, and inverse functions, linear inequalities, absolute values, and conics.

### **Advanced Math II and Calculus I Honors**

*Course No.: 3010*  
*Prerequisite: Advanced Math I*  
*Credit: 1.0 / Full Year*  
*Fees:*  
*Grades: 11, 12*  
*Other: A TI-84+ graphing calculator is required. Only semester 2 is for Honors credit.*

**Advanced Math II and Calculus I Honors** includes topics in combinatorics, probability, sequences, series, polar curves, trigonometry and parametric equations. Limits, differentiation and an introduction to integration are included in the Calculus portion of the course.

### **Advanced Placement Calculus AB**

*Course No.: 3014*  
*Prerequisite: Advanced Math*  
*Credit: 1.0 / Full Year*  
*Fees:*  
*Grades: 11, 12*  
*Other: A TI-84+ graphing calculator is required.*

**Advanced Placement Calculus AB** is a college level course whose topics are prescribed by the College Entrance Examination Board. Extensive work is done in the areas of elementary functions and differential calculus, as well as in some of the topics of integral calculus. Students are expected to take the Advanced Placement examination. This course is equivalent to one semester of college calculus.

### **Advanced Placement Calculus BC**

*Course No.: 3016*  
*Prerequisite: Advanced Math Honors*  
*Credit: 1.0 / Full Year*  
*Fees:*  
*Grades: 11, 12*  
*Other: A TI-84+ graphing calculator is required.*

**Advanced Placement Calculus BC** is a college level course whose topics are prescribed by the College Entrance Examination Board. Extensive work is done in the areas of elementary functions, differential calculus, and integral calculus. Some fundamental work is also done in the areas of sequences and series and differential equations. Students are expected to take the Advanced

Placement examination. This course is equivalent to two semesters of college calculus. Students who have completed Calculus AB can only earn credit for the second semester of Calculus BC.

### **Advanced Placement Computer Science**

*Course No.: 3018*  
*Prerequisite: Computer Science Honors*  
*Credit: 1.0 / Full Year*  
*Fees: \$20.00*  
*Grades: 10, 11, 12*  
*Other:*

### **Advanced Placement Computer Science (JAVA)**

is a college level course whose topics are prescribed by the College Board. The course covers materials that would normally comprise three or more hours of college level computer science course work. Topics include object oriented programming, methodology, inheritance, classes, case study analysis, array processing, data types, iteration, and selection. Students are expected to attain mastery of fundamental programming techniques.

### **Advanced Placement Statistics**

*Course No.: 3020*  
*Prerequisite: Algebra II or Algebra II Honors*  
*Credit: 1.0 / Full Year*  
*Fees:*  
*Grades: 10, 11, 12*  
*Other: A TI-84+ graphing calculator is required.*

**Advanced Placement Statistics** introduces students to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Students are exposed to four broad conceptual themes: exploring data, planning a study, anticipating patterns in advance and performing statistical inference. Students will complete a variety of projects throughout the year. Students who successfully complete the course and examination may receive credit and/or advanced placement for a one-semester introductory college statistics course.

### **Algebra I**

*Course No.: 3024*  
*Prerequisite: Placement*  
*Credit: 1.0 / Full Year*  
*Fees:*  
*Grades: 9, 10, 11, 12*  
*Other: A TI-84+ graphing calculator is required.*

**Algebra I** topics include properties of real numbers, linear equations and inequalities and their graphs, solving equations, systems of linear equations, algebraic expressions, quadratic equations, functions, operations with polynomials and radicals, properties of exponents, factoring, general problem solving, critical thinking, and elementary probability and statistics concepts.

### **Algebra I Two Period Option**

*Course No.: 3030*

*Prerequisite: Placement*

*Credit: 2.0 / Full Year*

*Fees:*

*Grades: 9, 10, 11, 12*

*Other: Meets two consecutive periods each day. A TI-84+ graphing calculator is required.*

**Algebra I Two Period Option** is designed and paced in a way to help students both learn and retain algebraic concepts. Topics include properties of real numbers, linear equations and inequalities and their graphs, solving equations, systems of linear equations, algebraic expressions, quadratic equations, functions, operations with polynomials and radicals, properties of exponents, factoring, general problem solving, critical thinking, and elementary probability and statistics concepts. This course fulfills the Algebra I component of Illinois' math graduation requirement.

### **Algebra II**

*Course No.: 3032*

*Prerequisite: Algebra I and Geometry*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Algebra II** (does not include Trigonometry) includes such topics as the real number system, functions and relations, linear functions, systems of linear equations and inequalities, quadratic functions, exponential and logarithmic functions, rational functions, irrational algebraic functions, and matrices. A strong emphasis is placed on problem solving and technology applications.

### **Algebra II Honors**

*Course No.: 3034*

*Prerequisite: Geometry Honors or Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Algebra II Honors** offers fast paced and in-depth coverage of all Algebra II and Trigonometry topics (see Algebra II and Trigonometry course descriptions for further information).

### **Computer Science Honors**

*Course No.: 3041F, 3042S*

*Prerequisite: Geometry, concurrent enrollment in Geometry Honors or Placement*

*Credit: 0.5 / Semesters 1 and 2*

*Fees: \$10.00*

*Grades: 9, 10, 11, 12*

*Other:*

**Computer Science Honors (Alice)** is a course for any student interested in computer programming. The student will use Alice to learn fundamental programming

concepts in the context of creating 3-D animated movies and simple video games. In Alice, 3-D objects (e.g., people, animals, and vehicles) populate a virtual world and students create programs to animate these objects. Topics include programming methodology, iteration, data selection, function design, and arrays. The student will receive a firm foundation of computer programming needed to take the Advanced Placement Computer Science course.

### **Geometry**

*Course No.: 3050*

*Prerequisite: Algebra I or Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 9, 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Geometry** students will learn to recognize and understand the various geometric shapes and solids, and know their properties. They will develop deductive reasoning ability and use it on proofs of geometric ideas. The course includes such topics as polygons, similar figures, circles, areas and volumes, three-dimensional figures, and drawing and construction of lines, planes, and angles.

### **Geometry Honors**

*Course No.: 3052*

*Prerequisite: Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 9, 10*

*Other: A TI-84+ graphing calculator is required.*

**Geometry Honors** includes all the topics taught in the Geometry course. In addition, topics of Euclidean Geometry that cover logical reasoning (proofs), coordinate geometry, right triangle and non-right triangle trigonometry, loci of points and a brief look at non-Euclidean geometry are included.

### **Informal Geometry**

*Course No.: 3060*

*Prerequisite: Algebra CD or Algebra I*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Informal Geometry** will be similar to Geometry with the difference being a light emphasis on formal "proofs". Informal Geometry will study shapes and sizes and their uses in real life. Students will study area, volume, congruency, similarity, special right triangles, and right triangle trigonometry.

## **Intermediate Algebra II**

*Course No.: 3064*

*Prerequisite: Informal Geometry or Geometry*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Intermediate Algebra II** is an intermediate second year algebra course. Students will study linear and exponential relationships, relations and functions, systems of linear equations and inequalities, matrices, quadratic functions, variation, rational functions, and radical functions. The instruction is designed and paced in a way to help students both learn and retain mathematical concepts while connecting them to the real world.

## **Pre-Engineering Honors**

*See Applied Technology listing for course description.*

## **Statistics**

*Course No.: 3071F, 3072S*

*Prerequisite: Algebra II or Algebra II Honors*

*Credit: 0.5 / Semesters 1 and 2*

*Fees:*

*Grades: 11, 12*

*Other: A TI-84+ graphing calculator is required.*

People in nearly every field of endeavor need to know how to collect, organize, analyze and especially interpret numerical information. Many of the problems you encounter in **Statistics** are collected from real life situations. Topics include measures of central tendency, probability, hypothesis testing, models of regression and standardized normal curve analysis.

## **Trigonometry**

*Course No.: 3077F, 3078S*

*Prerequisite: Algebra II. By department recommendation only, a student may take this course concurrently with semester 2 Algebra II.*

*Credit: 0.5 / Semesters 1 and 2*

*Fees:*

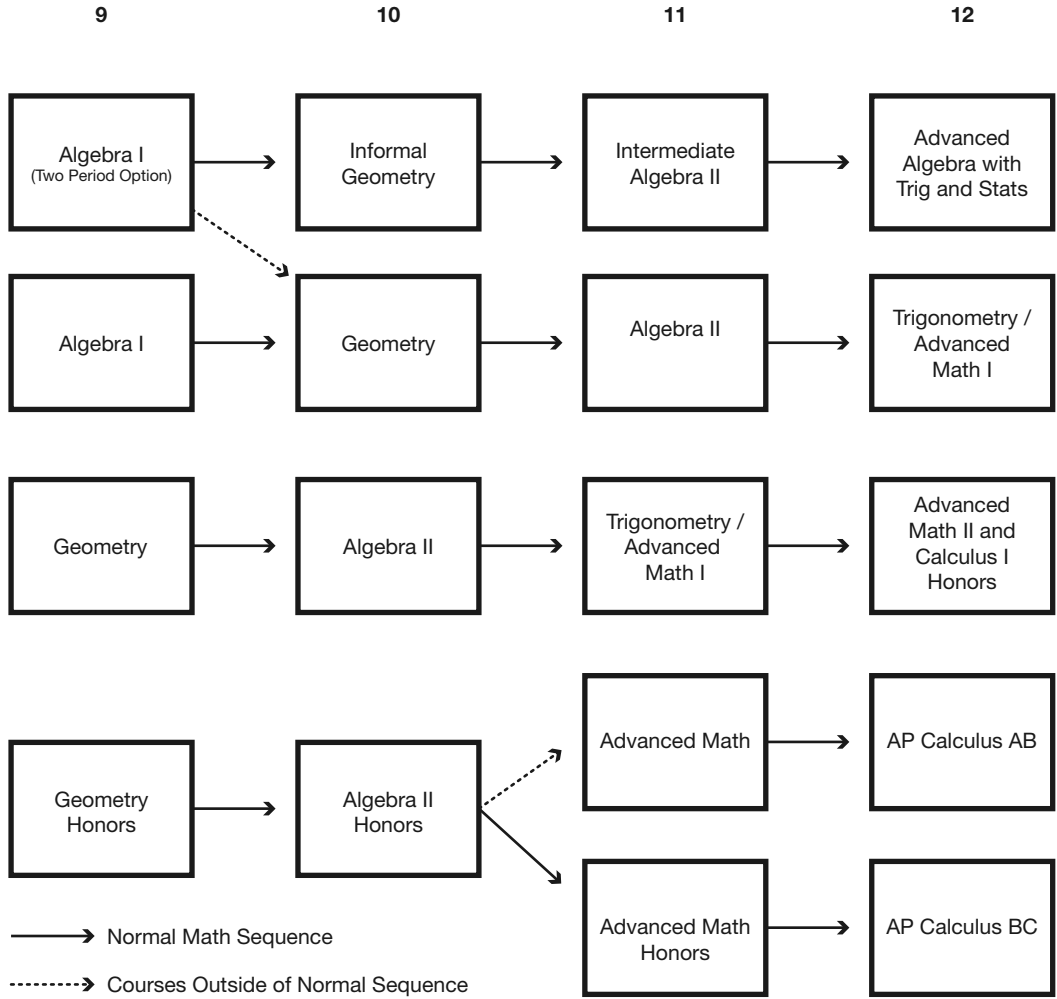
*Grades: 10, 11, 12*

*Other: A TI-84+ graphing calculator is required.*

**Trigonometry** covers applied trigonometry, including right triangle trigonometry, law of sines and cosines, graphing of trigonometric functions, and sinusoidal modeling. The course also covers identities, complex numbers, solutions of equations, inverses, complex numbers, introduction to polar topics, and topics required for the study of Calculus. Many universities require a background in this area.

# Mathematics Department

## Course Sequences



<b>Electives</b> – See course descriptions for prerequisites.	
<ul style="list-style-type: none"> <li>• AP Computer Science</li> <li>• AP Statistics</li> <li>• Computer Science Honors</li> <li>• Statistics</li> </ul>	<ul style="list-style-type: none"> <li>• * Business Math (Business Ed. Department)</li> <li>• * Pre-Engineering Honors (Applied Tech. Dept.)</li> </ul> <p style="font-size: small; margin-top: 5px;">* This course is not accepted as a math credit by some colleges and universities.</p>