

MATHEMATICS DIVISION

GWEN ZIMMERMANN, DIRECTOR

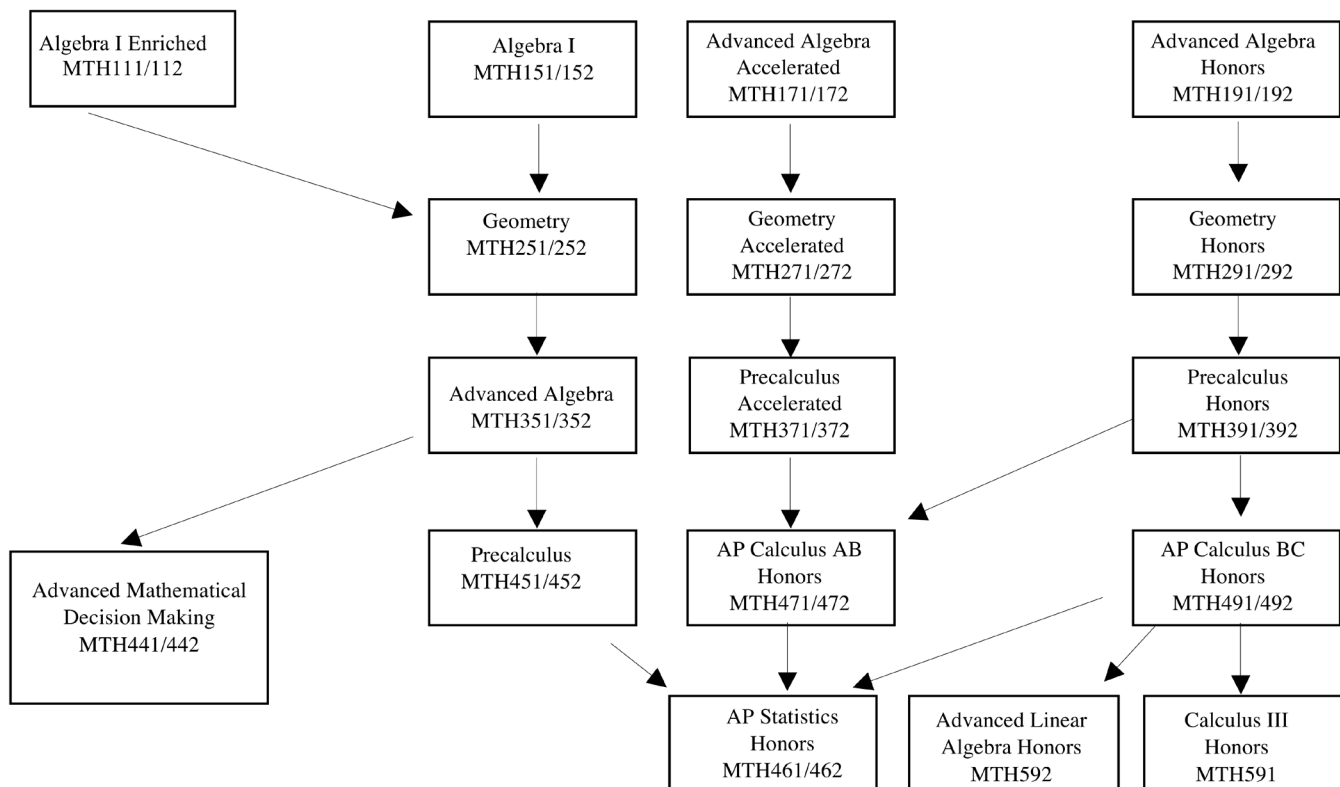
The Mathematics Division offerings provide options and electives for meeting individual needs, experiences, and goals. Course offerings provide opportunities for the development of problem-solving skills and techniques for theoretical and applied settings. Instructional design promotes student-engaged learning activities. Graphing calculators are used as an integral part of concept development. These skills and techniques will serve the student in future career or educational undertakings.



Students must pass at least six (6) semesters, including Algebra and at least one course with geometry content.



MATHEMATICS DIVISION SEQUENCE



1. Freshmen begin the sequence in one of five courses: Algebra I Enriched, Algebra I, Advanced Algebra Accelerated, Advanced Algebra Honors, or Geometry Honors.
2. Freshmen receiving a six-week grade of “D” or “F” and Sophomores receiving a six-week grade of “F” will participate in Mandatory Tutoring in the Learning Center for the following six weeks.
3. The Computer Science electives sequence can be found on page 55.

Calculator Recommendation

A TI84-Plus is recommended for all College Core, College Prep, and Accelerated Mathematics courses.

A TI89 is recommended for all Honors level Mathematics courses.

Algebra I Enriched (Core)

MTH111-Semester 1, MTH112-Semester 2

Open to 9-10-11-12

Full Year

Prerequisite: Placement exam and approval of Director

Students in this course will meet for two consecutive periods so that by the end of this course students will have completed a year of algebra as well as developed readiness skills necessary for success in future mathematics courses. This course is designed to emphasize the development of skills, techniques and applications that deal with algebra, number relations, linear equations, formulas, polynomials, graphing, systems of equations, factoring, quadratic and exponential equations. Completion of this course prepares a student for further work in mathematics, usually in Geometry. Upon successful completion of this course, students will receive two credits, one mathematics credit and one elective credit.

Algebra I (College Prep)

MTH151-Semester 1, MTH152-Semester 2

Open to 9-10

Full Year

Prerequisite: Placement exam or approval of Director

This course emphasizes the development of concepts, skills, techniques, and applications that address number relations, linear functions, exponential functions, quadratic functions, systems of linear equations, probability and statistics. Successful completion of this course will prepare students for entry into a geometry sequence.

Geometry (College Prep)

MTH251-Semester 1, MTH252-Semester 2

Open to 10-11-12

Full Year

Prerequisite: Algebra I or equivalent

This course deals with sets of points and related properties. Sets studied include lines, angles, polygons, with emphasis on circles, planes and surfaces of geometric solids such as pyramids, cones, cylinders and spheres. This sequence emphasizes systematic approaches to and processes for proving and applying theorems. Algebra is utilized extensively during the course. Successful completion of this course prepares the students for further work in Advanced Algebra.

Advanced Algebra (College Prep)

MTH351-Semester 1, MTH352-Semester 2

Open to 11-12

Full Year

Prerequisite: Geometry or Geometry C

This course extends topics learned in Algebra 1 and introduces new topics that prepare students for Precalculus or Advanced Mathematical Decision Making. Students solve, graph, and write equations for polynomial, quadratic, piece-wise, rational, exponential, and logarithmic functions and use them to model a variety of situations. In addition, students study complex numbers, radicals, matrices, probability, sequences, and series.

Precalculus (College Prep)

MTH451-Semester 1, MTH452-Semester 2

Open to 11-12

Full Year

Prerequisite: Advanced Algebra

This course includes the topics of polynomial, rational and algebraic functions, complex numbers, trigonometric equations, identities, inverse trigonometric functions, statistics, logarithms, permutations, combinations, and probability. Students completing this sequence will be prepared for a college-level calculus course.

Advanced Mathematical Decision Making (College Prep)

MTH441-Semester 1, MTH442-Semester 2

Open to 12

Full Year

Prerequisite: Successful completion of Advanced Algebra

This course is designed for students who are college bound non-mathematics majors. Specific emphasis will be on problem solving using ratio, rate and proportions, probability, combinatorics, graph theory, finance, statistical analysis, mathematical modeling using logistic growth, exponential, periodic functions and finance.

Accelerated Sequence

Advanced Algebra (Accelerated)

MTH171-Semester 1, MTH172-Semester 2

Open to 9-10-11

Full Year

Prerequisite: Approval of Director; Recommended for Freshmen

This course is designed to provide the student with a extensive algebra background. Using multiple representations, students will study the real number system; linear, quadratic, higher degree polynomial, exponential, logarithmic, and rational expressions, equations, and functions; matrices; sequences and series; and probability. Successful completion of this sequence prepares the student for Geometry Accelerated.

Geometry (Accelerated)

MTH271-Semester 1, MTH272-Semester 2

Open to 10-11-12

Full Year

Prerequisite: Advanced Algebra Accelerated or approval of Director. Recommended for Sophomores

This course requires the students to complete an in-depth study of Euclidean Geometry. Topics include coordinate geometry, proof, congruent triangles, similar triangles, polygons, circles, area and volume. The course teaches and extends problem solving skills and the development of logical reasoning to communicate mathematics. Successful completion of this course prepares a student for Precalculus Accelerated.

Precalculus (Accelerated)

MTH371-Semester 1, MTH372-Semester 2

Open to 11-12

Full Year

Prerequisite: Advanced Algebra Accelerated and Geometry Accelerated or approval of Director

This course provides an in-depth study of precalculus mathematics. Topics include polynomial, rational, algebraic, exponential, logarithmic and trigonometric functions and relations, conics and their properties, the complex number system, inequalities, probability and statistics. Successful completion of this course provides the student with the necessary prerequisites for Advanced Placement Calculus AB.

Advanced Placement Statistics (Honors)

MTH461-Semester 1, MTH462-Semester 2

Open to 11-12

Full Year

Prerequisite: Precalculus (any level)

The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: 1. Exploring Data: Describing patterns and departures from patterns. 2. Sampling and Experimentation: Planning and conducting a study. 3. Anticipating Patterns: Exploring random phenomena using probability and simulation.

4. Statistical Inference: Estimating population parameters and testing hypotheses. Students enrolled in this course are expected to write the Advanced Placement Statistics examination.

Advanced Placement Calculus AB (Honors)

MTH471-Semester 1, MTH472-Semester 2

Open to 12

Full Year

Prerequisite: Precalculus Accelerated

AP Calculus AB is primarily concerned with developing students' understanding of the concepts of calculus and providing experience with its methods and applications. The course emphasizes a multirepresentational approach to calculus with concepts, results, and problems expressed graphically, numerically, analytical, and verbally. The connections among these representations are also important. Topics covered in this course include limits, differentiation, integration, continuity, indeterminate forms, and improper integrals. Students enrolled in this course are expected to write the Advanced Placement Calculus AB examination.

Honors Sequence

Advanced Algebra (Honors)

MTH191-Semester 1, MTH192-Semester 2

Open to 9

Full Year

Prerequisite: Approval of Director

This course deals with an in-depth study of the topics covered in the Advanced Algebra Accelerated sequence. Additional content includes the study of permutations and combinations, probability, sequences, and series. Successful completion of this sequence prepares the student for entry into the Geometry Honors sequence. Since the student will cover content normally taught in the Advanced Algebra course, students successfully completing Advanced Algebra Honors may not register for credit in Advanced Algebra.

Geometry (Honors)

MTH291-Semester 1, MTH292-Semester 2

Open to 9-10

Full Year

Prerequisite: 10th Graders: Advanced Algebra Honors or approval of Director

This course is an in-depth study of Euclidean geometry including extension topics of coordinate geometry, geometric probability and transformations. The course stresses problem solving skills and the development of logical reasoning and communication of mathematics. Advanced Algebra topics are integrated extensively throughout the course. Successful completion will prepare the student for Precalculus Honors.

Precalculus (Honors)

MTH391-Semester 1, MTH392-Semester 2

Open to 10-11

Full Year

Prerequisite: Advanced Algebra Honors and Geometry Honors or approval of Director

This course is a continuation of the mathematics studied in Advanced Algebra Honors and Geometry Honors. The content includes that of Precalculus as well as topics related to limits, matrix algebra, discrete mathematics, polar coordinates, proof by induction, and conic sections. Successful completion of this sequence prepares the student for entry into Advanced Placement Calculus BC.

Advanced Placement Calculus BC (Honors)

MTH491-Semester 1, MTH492-Semester 2

Open to 11-12

Full Year

Prerequisite: Precalculus Honors or approval of Director

This course deals with the BC content of the Advanced Placement curriculum beyond that of the Calculus AB sequence. Additional topics include sequences, infinite series, solutions of differential equations, advanced techniques of integration, as well as parametric and polar equations. Students enrolled in this course are expected to write the Advanced Placement Calculus BC examination.

Calculus III (Honors)

MTH591-Semester 1 Only

Open to 12

One Semester

Prerequisite: Advanced Placement Calculus BC or approval of Director

This course is the last of a three-course sequence in calculus and analytic geometry and includes the essential elements of multi-variable calculus as well as the analytic geometry of space. Students perform operations with vectors, lines and planes, understand and apply curves and surfaces, understand and apply concepts involving differentiation for functions of several variables, and compute double and triple integrals. In addition, students will perform operations of polar coordinates and parametric equations. This course is a dual credit, college-level math course that is offered in collaboration with Oakton Community College. Classes are held at Stevenson High School and are taught by a Stevenson teacher. Students can earn college credit through Oakton Community College, as well as Stevenson High School credit.

Advanced Linear Algebra (Honors)

MTH592-Semester 2 Only

Open to 12

One Semester

Prerequisite: Advanced Placement Calculus BC or approval of Director

This course provides detailed work in the study of vectors and vector spaces. Topics include solving n by n systems of equations, operating within a vector space, performing linear transformations of vector spaces and locating eigen vectors and eigen values. This course is equivalent to a one semester college linear algebra course. This course is a dual credit, college-level math course that is offered in collaboration with Oakton Community College. Classes are held at Stevenson High School and are taught by a Stevenson teacher. Students can earn college credit through Oakton Community College, as well as Stevenson High School credit.

Mathematics Seminar (Honors)

MTH571-Semester 1, MTH572-Semester 2

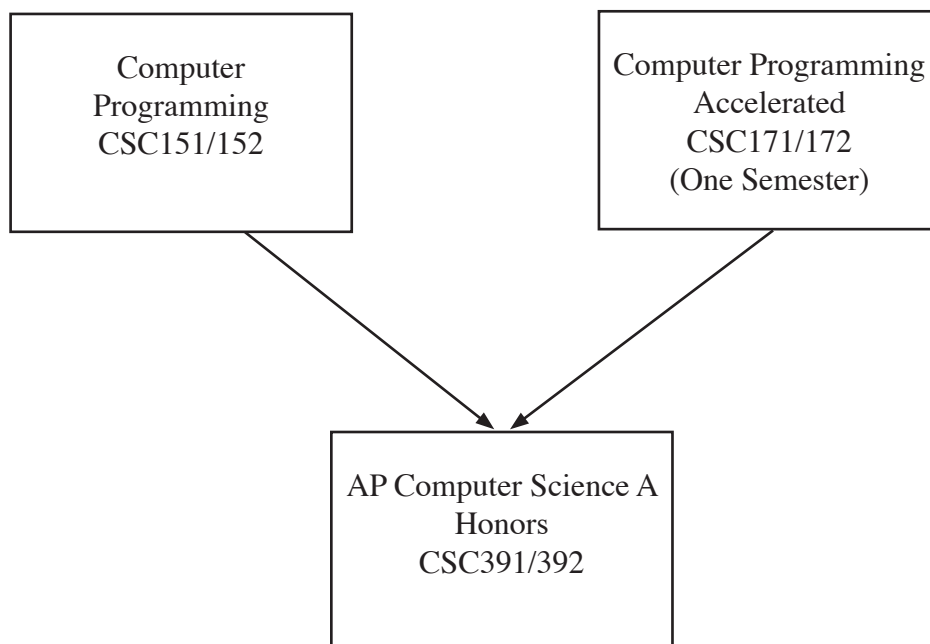
Open to 12

One Semester

Prerequisite: Approval of Director

This course is designed to explore a series of topics that are of special interest to members enrolled within the class. Students with special interests and talents are called upon to share in the instructional process.

Computer Science



NOTE: Unless noted otherwise, courses are full year.

Electives

Computer Programming (College Prep)

CSC151-Semester 1, CSC152-Semester 2

Open to 9-10-11-12

Full Year

Prerequisite: Concurrent enrollment or credit in Algebra I

Students will learn to program computers using both Java and C++. The course will begin with introductory programs in C++. Students learn Java to write graphics-related programs which can run as applets on web pages. Students will also investigate the graphics features of Java applets. Java and C++ are both used to write simple text-based and graphics related computer games. Students cannot earn credit in CSC 151/152 and Computer Programming (Accelerated). Successful completion of this course prepares the student to continue in Advanced Placement Computer Science A.

Computer Programming (Accelerated)

CSC171-Semester 1, CSC172-Semester 2

Open to 9-10-11-12

One Semester

Prerequisite: Freshmen enrolled in Algebra I

This course introduces students to computer programming using both Java and C++. Students use Java to write several simple game applications as well as learn how to include buttons and pop-up menus within Java applets (which can be run as a web-page). Students use Java applets to write programs with both random and student-designed graphics/animations. C++ will be used for the first several weeks to introduce the general programming concepts that are needed in both C++ and Java. Introductory topics include using data files, translating formulas, using loops to get

the computer to automate steps, etc. Successful completion of this one semester course prepares the student for Advanced Placement Computer Science A.

Advanced Placement Computer Science A (Honors)

CSC391-Semester 1, CSC392-Semester 2

Open to 10-11-12

Full Year

Prerequisite: Computer Programming College Prep or Accelerated and concurrent enrollment or credit in Advanced Algebra or approval of Director

In the first semester, students learn about arrays, ArrayLists, sorting/searching techniques, class (object-oriented) design and stacks, and queues. Several graphics-oriented projects are used to illustrate and practice key concepts. During second semester students learn more advanced data structures such as linked lists, trees, sets, and maps. Students learn and focus on object-oriented programs. This AP course will prepare the student for the AP Computer Science exam. Students may earn one semester of college credit in Data Structures/Algorithms.