



## MATHEMATICS DIVISION

**DARSHAN JAIN, DIRECTOR** | [DJAIN@D125.ORG](mailto:DJAIN@D125.ORG) | 847-415-4600

SCAN QR CODE TO READ MORE ABOUT MATHEMATICS ONLINE:  
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The Mathematics Division believes that all students can experience mathematical thinking as sensible, worthwhile, accessible, and doable. Students will develop flexibility in learning and thinking through the application of the Standards of Mathematics Practices (CCSSM, 2010). These critical skills traverse all mathematics coursework and support students' active engagement and agency in learning. Students will develop skills to connect various representations of mathematics to analyze, interpret, and reason critically around concrete real-world scenarios and abstract concepts. In addition to experiencing the study of mathematics as useful and practical, students will understand the relevance of mathematics for the cultural and social contributions it affords. The instructional design promotes cooperative learning, student-engaged learning activities, and independent practice. Graphing calculators and other technologies are used to support concept development and depth of understanding.

Students must earn course credit for at least six semesters of mathematics coursework including Algebra 1 and at least one course with geometry content. Eight semesters of mathematics is highly recommended to support continuity and preparation for post-secondary requirements or opportunities.



## ALGEBRA 1 (COLLEGE PREP)

MTH151—SEMESTER 1

OPEN TO 9-10

PREREQUISITE: COMPLETION AND DEMONSTRATED PROFICIENCY IN COMMON CORE STATE STANDARDS MATHEMATICS GRADE 8 (CCSSM8).

MTH152—SEMESTER 2

FULL YEAR

This course is designed to engage students in the practice of mathematics by developing an understanding of mathematical relationships, functions, and models, both in and out of context, with an emphasis on problem solving. Algebraic topics will be developed and valued conceptually leading to procedural fluency. Students will utilize concepts, skills, representations, and techniques that address linear functions, exponential functions, quadratic functions, and systems of equations. This course also uses statistical models to analyze relationships represented by data. Successful completion of this course will prepare students for entry into Geometry.

## GEOMETRY (COLLEGE PREP)

MTH251—SEMESTER 1

OPEN TO 10-11

PREREQUISITE: ALGEBRA 1

MTH252—SEMESTER 2

FULL YEAR

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 course 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 Algebra 2.

## ALGEBRA 2 (COLLEGE PREP)

MTH351—SEMESTER 1

OPEN TO 11-12

PREREQUISITE: GEOMETRY

MTH352—SEMESTER 2

FULL YEAR

This course is designed to provide students with a thorough background in advanced algebraic topics in preparation for continued coursework in Precalculus (MTH451/452) and Advanced Mathematical Decision Making (MTH441/442). Central to classroom experience is extending prior coursework and improving mathematical reasoning skills. Topics include inverses and transformations of functions, the study of the polynomial, rational, exponential, logarithmic, and trigonometric function families with an increased emphasis on modeling, and systems of equations, probability, and statistics.

## ADVANCED MATHEMATICAL DECISION MAKING (COLLEGE PREP)

MTH441—SEMESTER 1

OPEN TO 12

PREREQUISITE: ALGEBRA 2

MTH442—SEMESTER 2

FULL YEAR

This course is designed for students who are college-bound, non-STEM 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, and periodic functions.

## PRECALCULUS (COLLEGE PREP)

MTH451—SEMESTER 1

OPEN TO 11-12

PREREQUISITE: ANY LEVEL GEOMETRY AND ANY LEVEL ALGEBRA 2

MTH452—SEMESTER 2

FULL YEAR

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

## MATHEMATICAL MODELING AND DESIGN (COLLEGE PREP)

MTH431—SEMESTER 1

OPEN TO 12

PREREQUISITE: PRECALCULUS CP OR PRECALCULUS AC

MTH432—SEMESTER 2

FULL YEAR

*Have you ever wondered “Where can I use this mathematics” or “How can I use math to make a situation better?”* This course is a capstone experience for students who have completed PreCalculus (CP) or PreCalculus (AC). This is an introductory study of mathematical modeling and design thinking. Modeling is useful to understand the world and to make informed improvements and decisions. In this course, students will build on their prior mathematics knowledge and apply new skills (stochastic methods, statistical models, numerical analysis, digital simulations, etc.), to model real-world situations. Students will develop a “research question”, and construct flexible models that they improve over time. As a capstone project, students will have a choice in developing and applying a model in their area of interest. Collaboration and effective communication through written and presentational formats will be emphasized. This course helps students with interests in mathematics, social science, finance, business, science, or engineering to apply mathematics in meaningful ways.

### ALGEBRA 2 (ACCELERATED)

MTH171—SEMESTER 1  
OPEN TO 9-10-11  
PREREQUISITE: COMPLETION AND DEMONSTRATED PROFICIENCY IN ALGEBRA 1

MTH172—SEMESTER 2  
FULL YEAR

This course is designed to provide students with an extensive background in advanced algebraic topics. Students will investigate a wide array of topics including inverses and transformations of functions, the study of the polynomial, exponential, rational, exponential, logarithmic, and trigonometric function families with an increased emphasis on modeling, systems of equations, probability, and statistics. Within these topics, some are studied at greater depth in order to prepare students to take advanced mathematics courses such as calculus, advanced statistics, or discrete mathematics. Successful completion of this course prepares the student for Geometry Accelerated.

### GEOMETRY (ACCELERATED)

MTH271—SEMESTER 1  
OPEN TO 9-10-11  
PREREQUISITE: ALGEBRA 2 ACCELERATED

MTH272—SEMESTER 2  
FULL YEAR

This course requires 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  
OPEN TO 10-11-12  
PREREQUISITE: GEOMETRY ACCELERATED

MTH372—SEMESTER 2  
FULL YEAR

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 AP Calculus AB.

### GEOMETRY (HONORS)

MTH291—SEMESTER 1  
OPEN TO 9-10  
PREREQUISITE: COMPLETION AND DEMONSTRATED PROFICIENCY IN ALGEBRA 2 ACCELERATED

MTH292—SEMESTER 2  
FULL YEAR

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. Algebra 2 topics are integrated extensively throughout the course. Successful completion will prepare the student for Precalculus Honors.

### PRECALCULUS (HONORS)

MTH391—SEMESTER 1  
OPEN TO 10-11  
PREREQUISITE: GEOMETRY HONORS

MTH392—SEMESTER 2  
FULL YEAR

This course is a continuation of the mathematics studied in Algebra 2 Accelerated and Geometry Honors. The content includes that of Precalculus Accelerated as well as topics related to limits, vector theory, matrix algebra, discrete mathematics, polar coordinates, proof by induction, and conic sections. Successful completion of this sequence prepares the student for entry into AP Calculus BC.

### AP CALCULUS AB (HONORS)

MTH471—SEMESTER 1  
OPEN TO 11-12  
PREREQUISITE: PRECALCULUS ACCELERATED

MTH472—SEMESTER 2  
FULL YEAR

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 multi-representational approach to calculus with concepts, results, and problems expressed graphically, numerically, analytically, 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 who enroll in this course will be prepared to take the AP Calculus AB exam in May.

### AP CALCULUS BC (HONORS)

MTH491—SEMESTER 1  
OPEN TO 11-12  
PREREQUISITE: PRECALCULUS HONORS

MTH492—SEMESTER 2  
FULL YEAR

This course deals with the BC content of the AP 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 who enroll in this course will be prepared to take the AP Calculus BC exam in May.

### AP STATISTICS (HONORS)

MTH461—SEMESTER 1  
OPEN TO 11-12  
PREREQUISITE: PRECALCULUS (ANY LEVEL)

MTH462—SEMESTER 2  
FULL YEAR

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—Exploring Data: describing patterns and departures from patterns; Sampling and Experimentation: planning and conducting a study; Anticipating Patterns: exploring random phenomena using probability and simulation, and Statistical Inference: estimating population parameters and testing hypotheses. Students who enroll in this course will be prepared to take the AP Statistics exam in May.

### CALCULUS 3 (HONORS)

MTH591—SEMESTER 1 ONLY  
OPEN TO 11-12  
PREREQUISITE: AP CALCULUS BC

ONE SEMESTER

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. Content focus is on vectors, functions of several variables, curves and surfaces, differentiation, partial derivatives, multiple integrals, and surface integrals.

### ADVANCED LINEAR ALGEBRA (HONORS)

MTH592—SEMESTER 2 ONLY  
OPEN TO 11-12  
PREREQUISITE: AP CALCULUS BC

ONE SEMESTER

The course covers matrices and the algebra of linear systems. Content includes equations, vector spaces, real inner product spaces, linear transformations, determinants, eigenvalues, eigenvectors, diagonalizability, quadratic forms, and symmetric matrices. This course is equivalent to a one-semester college linear algebra course.