

Mathematics

In every course we offer, the Mathematics Department strives to convey math as intrinsically interesting, interconnected, and deep. Our hope is that the curriculum will stimulate curiosity in students, and inspire creativity in problem-solving. Each course is designed to develop students' confidence in their ability to solve problems, and, ultimately, a love of learning. We see learning as collaborative, and we hope to cultivate compassionate communicators and listeners. We hope students see the utility of math beyond just the classroom, and that the habits of mind we pass on will serve them throughout their lives.

Requirements:

One of the following Geometry courses:

- Geometry and Problem Solving (MATH 210)
- Geometry (MATH 211)
- Geometry Honors (MATH 212H)

One of the following Algebra II & Trigonometry courses:

- Algebra II & Trigonometry (MATH 221)
- Algebra II & Trigonometry Honors (MATH 222H)

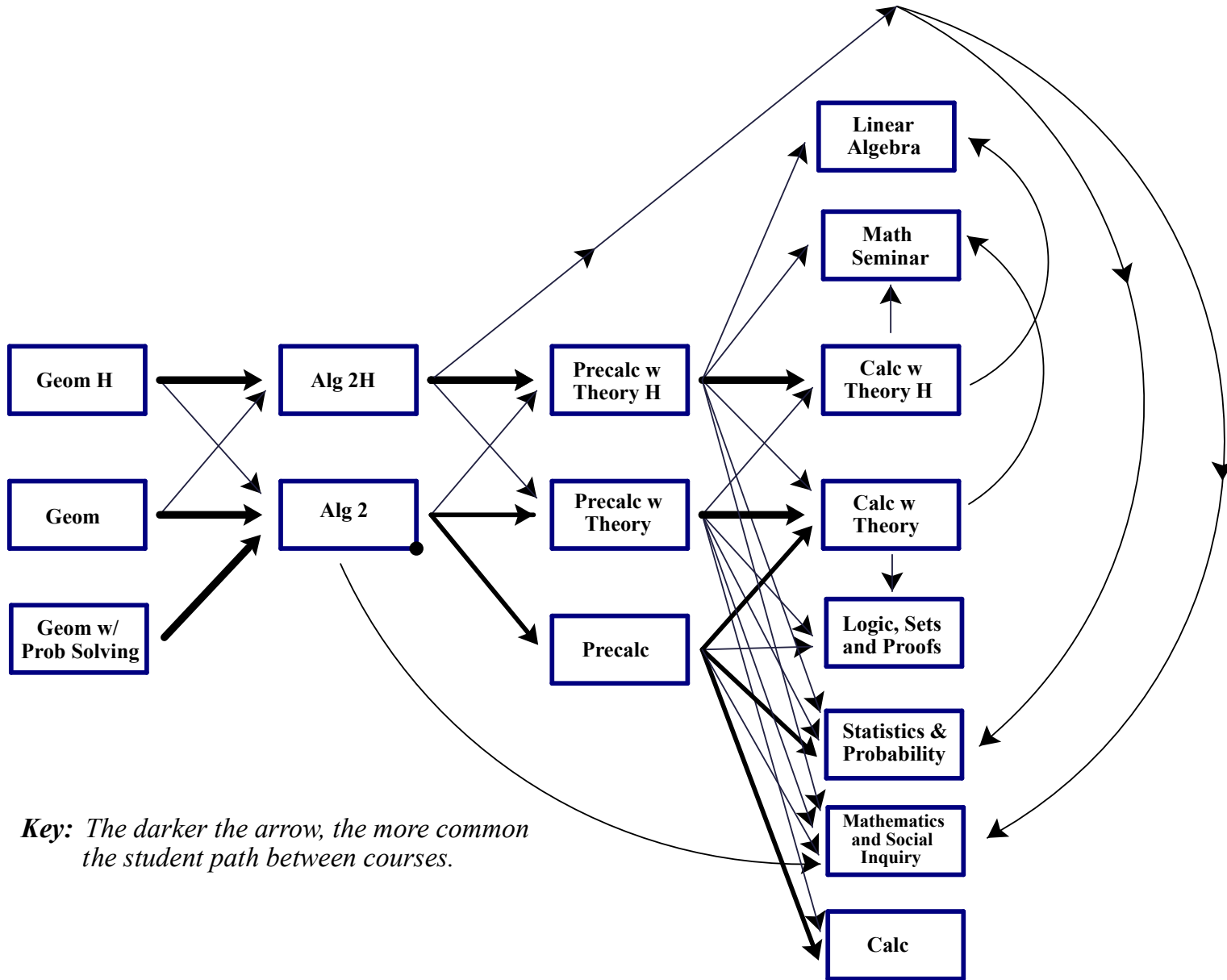
Elective Courses Offered in 2026-27

300-level

- Precalculus (MATH 310)
- Calculus (MATH 350)
- Mathematics and Social Inquiry (MATH 365)

400-level

- Precalculus with Theory (MATH 410)
- Precalculus with Theory Honors (MATH 411H)
- Calculus with Theory (MATH 420)
- Calculus with Theory Honors (MATH 421H)
- Statistics and Probability (MATH 430)
- Logic, Sets, and Proof (MATH 435)
- Linear Algebra (MATH 445)
- Math Seminar (MATH 450)



Key: The darker the arrow, the more common the student path between courses.

Required Courses:**MATH 210- Geometry and Problem Solving**

Full credit, meets 5 days/week

Prerequisites: Algebra I

This geometry course is designed to serve students who have completed an Algebra I course and who need more work with algebra skills and more attention to individual learning needs. Like Geometry, this course conveys an appreciation of geometry as a deductive system and covers the traditional relationships between points, lines, triangles, polygons and circles in the plane. There is an emphasis on problem-solving techniques common to all studies of mathematics. Successful completion of this course leads to enrollment in Algebra II & Trigonometry in the following year.

MATH 211- Geometry

Full credit, meets 4 days/week

Prerequisites: Algebra I

The course is designed to convey an appreciation of geometry as a deductive system. Starting with undefined terms, postulates, and definitions, the students follow the progressive development of theorems and their proofs to create a mathematical structure with rich aesthetic and practical value. In building this axiomatic structure, they improve their ability to recognize and organize the various relationships among points, lines, triangles, polygons, and circles in the plane.

MATH 212H - Geometry Honors

Full credit, meets 4 days/week

Prerequisites: Honors Algebra I or Algebra I and departmental approval (see below)

In addition to the major topics of Geometry, the Honors sections study the advanced geometry of the triangle. After using the dynamic geometry software Geometer's *Sketchpad* to conjecture relationships in triangles, students prove theorems associated with the orthocenter, incenter, circumcenter and centroid. Throughout the course, great emphasis is placed on proof and the skills associated with effective communication of complex ideas. The year culminates in a final project in which pairs of students present the proof of a "great" theorem during a full class period. Approval requirements: Algebra I Honors and Algebra I students interested in Geometry Honors will be considered based on a combination of factors, including teacher recommendation, grades, and performance on a placement test.

MATH 221 - Algebra II & Trigonometry

Full credit, meets 4 days/week

Prerequisites: Geometry and Problem Solving (MATH 210), Geometry (MATH 211), or Geometry Honors (MATH 212H)

The thematic thread that ties this course together is the mathematical concept of a function. Students learn to interpret functions algebraically and graphically, as well as how to connect the two. Functions of particular interest are the sine, cosine, exponential, logarithmic, linear, quadratic, and absolute value. There is a substantial treatment of trigonometry and complex numbers. The course is driven by student-led investigations, facilitated by a graphing calculator and other tools. Skill-building is emphasized as students develop a toolbox of techniques for solving problems. Of equal importance, students encounter open-ended problem solving in which they learn how to devise their own strategies for tackling non-routine problems.

MATH 222H - Algebra II & Trigonometry Honors

Full credit, meets 4 days/week

Prerequisites: Geometry (MATH 211) or Geometry Honors (MATH 212H) and departmental approval (see below)

This Honors course covers the topics in Algebra II & Trigonometry in greater depth and serves as a rigorous introduction to higher mathematics. The course begins with abstract set theory and branches off to cover areas of mathematical modeling with functions, geometric and analytic trigonometry, and advanced analytic geometry. This is a demanding course, requiring a high level of abstraction and mathematical maturity. Students will be expected to stretch themselves intellectually and to grapple with exciting, difficult material throughout the year. Approval requirements: A year-end grade of a B or higher in Geometry Honors is required for admission. Students earning a year-end grade lower than a B in Honors Geometry must have departmental approval. In addition, in the spring, exceptionally high-performing students in Geometry (typically this means at least one semester with an A+ in MATH 211) who have spoken to their teachers about the jump to this course will be invited to sit for a non-routine problem-solving test to help gauge their readiness. In every case, departmental approval is required.

Elective Courses:**MATH 310 - Precalculus**

Full credit, meets 4 days/week

Prerequisites: Algebra II & Trigonometry (MATH 221) or Algebra II & Trigonometry Honors (MATH 222H) and departmental approval (see below)

In this course, students will use the skills they've developed in previous math courses to explore strategies for solving challenging, exciting problems. Through

real-world examples and modeling, students will learn how math appears in their everyday lives. The course includes a review of trigonometric functions along with a deeper look at their graphs, inverses, and applications. Other topics include sequences, polynomials, combinatorics, probability, exponential growth and decay, and optimization.

Approval requirements: A minimum grade of an exact C- when averaging both semesters in Algebra II & Trigonometry (MATH 221).

MATH 350 – Calculus

Full credit, meets 4 days/week

Prerequisites: Precalculus (MATH 310) or Precalculus with Theory (MATH 410) and departmental approval (see below)

This calculus course emphasizes depth and exploration. Technology, such as a graphing calculator, is used as a tool to examine the topics included in a traditional introductory calculus course: functions and their graphs; limits; the derivative and its applications; definite and indefinite integrals; and logarithmic, exponential, and trigonometric functions. In addition, students study topics not usually accessible in traditional calculus courses. Through calculator exercises, students take advantage of numerical methods to analyze problems, discover underlying concepts, and gain insight into the relationship between the geometric and algebraic representation of the central ideas.

Approval requirements: A minimum grade of an exact C or higher when averaging both semesters in Precalculus.

MATH 365- Mathematics and Social Inquiry

Full credit, meets 4 days/week

Prerequisites: Algebra 2 and Trigonometry (MATH 221) and departmental approval

The course can be taken concurrently with or after a Precalculus course, or with department approval.

This course is designed for students interested in applied math and social sciences. It situates mathematics as a framework for exploring social and political questions, examining it both as an analytical tool and as an object of social inquiry in its own right. Students will learn to model with mathematics, write clearly and confidently about these models, and bring mathematical ideas together with ideas from many other disciplines. Specific topics to be covered may include: elections and social choice theory, the mathematics of gerrymandering, measures of inequality, debt, social services optimization, perception and bias, algorithms and decision-making, the role of math in public discourse, and the math education system.

MATH 410 - Precalculus with Theory

Full credit, meets 4 days/week

Prerequisites: Algebra II & Trigonometry (MATH 221) or Algebra II & Trigonometry Honors (MATH 222H) and departmental approval (see below)

In this course, students will cover a variety of topics that inspire curiosity and require creative problem-solving techniques. Specifically, students will study elementary functions, including trigonometric, rational, polynomial, exponential, and logarithmic, both theoretically and through applications. This course also covers sequences and series, combinatorics, and probability.

Approval requirements: A minimum grade of an exact B+ or higher when averaging both semester grades in Algebra II & Trigonometry (211)

MATH 411H - Precalculus with Theory Honors

Full credit, meets 4 days/week

Prerequisites: Algebra II & Trigonometry (MATH 221) or Algebra II & Trigonometry Honors (MATH 222H) and departmental approval (see below).

This course involves a highly theoretical and rigorous approach to precalculus. Topics include vector analysis, modeling with parametric equations, combinatorics and probability, sequences and series, recursion, polar coordinates. Graphing calculators and computer applications are used for exploration.

Approval requirements: A year-end grade of a B or higher in Algebra II & Trigonometry Honors is required for admission. Students earning a year-end grade lower than a B in Algebra II & Trigonometry Honors must have departmental approval. In addition, in the spring, very high performing students in Algebra II & Trigonometry (typically this means at least one semester with an A+) who have talked to their teacher about this jump, will be eligible to sit for a diagnostic test to help gauge their readiness.

MATH 420 - Calculus with Theory

Full credit, meets 5 days/week

Prerequisites: Precalculus (MATH 310), Precalculus with Theory (MATH 410), or Precalculus with Theory Honors (MATH 411H) and departmental approval (see below)

This is a challenging math course that equips students with a strong foundation in calculus that will serve them well in future STEM courses. The focus of this course is differentiation and integration with applications to rates of change, optimization, area, and volume.

Approval requirements: A minimum grade of a B+ in each semester of Precalculus with Theory. If a student has a two-semester average of a B+ but a grade of a B or below in one semester, they will be required to sit for a diagnostic test to gauge their readiness. In addition, in the spring, very high performing students in Precalculus who would like to enroll in Calculus with Theory and have spoken with their teacher about this jump, will be eligible to sit for a diagnostic test to help gauge their readiness.

MATH 421H - Calculus with Theory Honors

Full credit, meets 5 days/week

Prerequisites: Precalculus with Theory (MATH 410) or Precalculus with Theory Honors (MATH 411H) and departmental approval (see below)

Calculus with Theory Honors is the culmination of the honors sequence in mathematics. In this course, students will investigate the central themes of both differential and integral calculus. Topics also covered are: special methods of integration, differential equations, infinite series, polar coordinates, arc lengths, and vectors and parametric equations.

Approval requirements: A year-end grade of a B or higher in Precalculus with Theory Honors. Students earning a year-end grade lower than a B in Precalculus with Theory Honors must have departmental approval. In unique circumstances, students who demonstrate exceptionally high achievement in Precalculus with Theory (typically this means at least one semester with an A+) may be considered for this course. Departmental approval is required.

MATH 430 - Statistics and Probability

Full credit, meets 5 days/week

Prerequisites: Algebra II & Trigonometry (MATH 221) or Algebra II & Trigonometry Honors (MATH 222H); Precalculus (MATH 310), Precalculus with Theory (MATH 410), or Precalculus with Theory Honors (MATH 411H) and departmental approval (see below)

This statistics course is similar to those required for college majors in the social sciences, health sciences, and business. Major concepts such as combinatorics, probability, data collecting, analyzing data, and drawing conclusions from data will be covered. Additionally, students will learn to interpret the various statistical representations that we encounter in our daily lives. Students should expect to learn through activities, lab exercises, discussion, and projects. This class makes extensive use of dynamic statistical data analysis software, such as Fathom.

Approval requirements: A minimum grade of an exact A- or higher when averaging both semester grades in Algebra II & Trigonometry. From Algebra II & Trigonometry Honors, a minimum of an exact B is required. From Precalculus, the requirement is a B+, Precalculus with Theory is a B, and Precalculus with Theory Honors is a B-.

MATH 435- Logic, Sets, and Proofs

Full credit, meets 4 days/week

Prerequisites: Precalculus (MATH 310) or Precalculus with Theory (MATH 410) and departmental approval

Corequisite: Calculus with Theory (MATH 420) (unless already taken)

This course is not available to students who have taken/are taking Precalculus with Theory Honors or Calculus with Theory Honors.

This course will explore proof writing through various lenses. Students begin with the foundations of sets and logic, which provide a structure for learning various

proof techniques, including direct proofs and proof by contradiction. They then move on to explore other mathematical topics including number theory, relations and functions, calculus, topology, and if time permits, group theory.

MATH 445- Linear Algebra

Full credit, meets 4 days/week

Prerequisites: Precalculus with Theory Honors (MATH 411H) and departmental approval (see below)

This course is designed for students with a serious interest in mathematics. Linear algebra is the study of systems of linear equations, properties of matrices, vector spaces and linear transformations. The course will focus on both theory and computation. Specific topics will include: Row reduction, matrix algebra, determinants, eigenvalues and eigenvectors, and orthogonality as well as a wide range of applications such as economic models, demographics, biology, networks, data analysis, signal processing, Markov chains, and dynamical systems.

Approval requirements: A minimum grade of B+ in both semesters in Precalculus with Theory Honors and departmental approval are required.

MATH 450 - Math Seminar

Full credit, meets 4 days/week

Prerequisites: Precalculus with Theory (MATH 410) or Precalculus with Theory Honors (MATH 411H) and departmental approval (see below)

This course is designed for students with a serious interest in pursuing higher mathematics. The course is problem-set based to give students the experience of working through complex material in an independent setting. The special topics offered vary from year to year and have, to date, included number theory, inversive geometry, linear algebra, multivariable calculus, finite calculus, continued fractions, game theory, and advanced problem-solving.

Approval requirements: A minimum grade of A- in Precalculus with Theory Honors and departmental approval are required. If a student has also taken Calculus with Theory Honors, a minimum grade of A- is required. In certain exceptional circumstances, a student who has completed Precalculus with Theory may be considered for approval for this course.

