

# MATHEMATICS

The mission of the Fishers High School Mathematics Department is to challenge students to become mathematically powerful in an ever-changing world. Students of mathematics will practice logical thinking strategies, utilize technology to promote analytical thinking, and they will master concepts to solve various problems for all disciplines.

Topics in the next course build significantly on the topics in the previous course. Therefore, the requirements of the course must be met to enter a particular course. If the requirements are not met and the student wishes to still take the course the parents will be required to sign a waiver form regarding the rigors of the course. Students who have passed a more difficult course may not go back and take a lower level course. **For a more detailed look at all of our courses listed, visit the Indiana Department of Education website, <http://www.doe.in.gov/standards/mathematics>**

---

**2520 ALGEBRA I (9, 10, 11, 12)** This course provides a formal development of algebraic skills and concepts. Topics include properties of real numbers, solution and evaluation of equations, including linear and quadratic, and inequalities, graphing of linear equations and systems of equations, use of exponents, and introductory topics from statistics and probability. **This course is a foundational course for all other math courses offered at Fishers High School, and passing Algebra I is a graduation requirement.**

**2516 ALGEBRA ENRICHMENT (9, 10, 11, 12)** Algebra Enrichment is a mathematics support course for Algebra I. The course provides students with additional time to build the foundations necessary for high school math courses, while concurrently having access to rigorous, grade-level appropriate courses. The five critical areas of algebra enrichment align with the critical areas of Algebra I: Relationships between quantities and reasoning with equations; linear and exponential relationships; descriptive statistics; expressions and equations; and quadratic functions and modeling. Algebra Enrichment is a lab course which allows for additional time and resources for students to continue to build on course work from Algebra I. **This course counts as a math course for the General Diploma only and as an elective for the Core 40, Core 40 with Honors, or Core 40 with Technical Honors Diplomas.**

**2532 GEOMETRY (9, 10, 11, 12)** This course covers primarily plane geometry with some solid geometry topics. It includes deductive and inductive reasoning; the ideas of logic are stressed. Properties and relationships of geometric figures including the study of angles, lines, planes, congruent and similar triangles, parallel lines, circles and their arcs and angles, trigonometric ratios, polygons, including similar polygons, and spheres, and three-dimensional relationships are all included. **Requirement: Successful completion of both semesters of Algebra I. This course may be taken at the same time as Algebra II.**

**2532 # GEOMETRY, HONORS (9, 10)** This course is offered to students recommended as most able in mathematics. The development of theorems will necessitate a working knowledge of measurement, congruence, similarity, parallelism, perpendicularity, transformations, probability, perimeter, area, volume, trigonometry, and application of algebraic concepts to geometry. This course differs from regular Geometry in that more topics are studied, concepts are investigated in greater depth, pacing is faster, and proofs and algebra are integrated throughout the entire course. Students considering this course should be active, inquisitive, and independent learners. **Requirement: "B" average in Algebra I. This course may be taken at the same time as Algebra II.**

\* 1-semester course

\*\* can be taken 1 or 2 semesters

# single-weighted course

## double-weighted course

**2522 ALGEBRA II (10, 11, 12)** This course extends knowledge of algebra. Topics include properties of real numbers, functions, graphing in two dimensions, inequalities, properties of exponents, systems of equations, rational exponents, radicals, logarithms, polynomials and polynomial functions, complex numbers, sequences and series, probability, and rational functions. **Requirement: Successful completion of Algebra I. May be taken concurrently w/ Geometry.**

**2522 # ALGEBRA II, HONORS (9, 10, 11)** This course is offered to students recommended as most able in mathematics. The content of the course includes all topics in Algebra II, presented from a more abstract and theoretical standpoint. Additional topics may include, linear programming, conic sections, and statistics. **Requirement: Successful completion of Honors Algebra 1 at the junior high level. Recommendation: A minimum grade of A- in both semesters of Honors Algebra 1.** This course may be taken at the same time as Geometry.

**2524 ANALYTICAL ALGEBRA II (9, 10, 11, 12)** This course should focus on the application of mathematics in various disciplines including business, finance, science, career and technical education and social sciences. This course covers most of the traditional Algebra II standards, but the focus is on the application of algebraic concepts rather than theoretical concepts. Building on previous work with linear, quadratic, and exponential functions, Analytical Algebra II should extend to include polynomial, rational, radical, logarithmic, and other functions. Students should be able to model real-world problems with various functions using and translating between multiple representations. Additionally, students should be able to interpret key features of function models within a given context. **Requirement: Successful completion of Algebra I. This course fulfills the Algebra II requirement for all diplomas; if students use this course to fulfill this credit, the parent must sign a consent form notifying the parent and the student that enrollment in Analytical Algebra II may affect the student's ability to attend a particular post-secondary educational institution because Analytical Algebra II may not align with the academic requirements established by the post-secondary educational institution.**

**2564/2566 PRE-CALCULUS/TRIGONOMETRY (10, 11, 12)** This is a two-credit course series with one credit awarded for successful completion of each semester. In the fall semester Pre-Calculus course, students will continue to study the characteristics of functions in general while exploring polynomial, exponential and logarithmic functions in greater detail. **Students will not use a calculator most of this course.** Students will be introduced to parametric functions and extend their prior understanding of sequence and series. In the spring semester course, students are introduced to Trigonometry first through the geometry of triangles. A link is then made from triangular geometry to periodic functions and analytic geometry. Students will also advance their understanding of complex numbers using the polar coordinate system. This course is intended for students who expect math to be a major component of their future college and career experiences, and is designed to provide students with a strong foundation for higher level math courses. *It is assumed that students taking this course will be moving on to a college level calculus course that would be appropriate for Engineering, Science, or Business majors. The goal of this course is to prepare students to take Advanced Placement Calculus AB or Advanced College Project Calculus.* **Requirement: Successful completion of Algebra I, Algebra II, and Geometry. Recommendation: A minimum grade of B both semesters of Honors Algebra 2.**

**2564 # PRE-CALCULUS/TRIGONOMETRY, HONORS (10, 11)** This is a year long course offered to students recommended as most able in mathematics. In addition to all of the topics of Precalculus and Trigonometry, this course includes, but is not limited to, the concept of a limit, continuity, trigonometric form of complex numbers, and mathematical induction. All topics are approached from theory, applications are more in-depth, and the course is paced much faster than regular pre-calculus. The goal of this course is to prepare students to take Advanced Placement Calculus BC. **Requirement: Honors Algebra II. Recommendation: A minimum grade of B both semesters of Honors Algebra 2.**

**2550 \* QUANTITATIVE REASONING (11, 12)** This is a one-semester course for students that plan to pursue degrees and careers in Arts & Humanities, Social & Behavioral Sciences, Health Sciences, Education, Sports Management, and other majors not related to Business or STEM fields. Through contemporary real-world applications, students will think and reason in numerical terms, scrutinize and use data to make informed judgments, and perform calculations and analyses in a range of applications and contexts. Topics include logic & critical thinking, analysis of growth, linear and exponential change, personal finance, graph theory, and voting & social choice. **Requirement: Successful completion of Algebra II.**

**2546 \* PROBABILITY AND STATISTICS (11, 12)** This one semester course is an introductory college-level statistics and probability course geared toward students majoring in fields other than math or engineering. Students will apply statistical techniques through decision-making and the use of critical thinking skills. Topics include data sampling, data variation, experimental design, descriptive statistics, measure of central tendency and spread of data, probability of independent and mutually-exclusive events, contingency tables, and the probability distribution function for a discrete random variable. Also included are binomial, geometric, hypergeometric, uniform, normal, and Student t distributions, as well as the Central Limit Theorem. **Requirement: Successful completion of Algebra II.**

**2570 ## AP STATISTICS (10, 11, 12)** This course is designed to aid students in applying statistical techniques in the decision making process. Students will be prepared to take the AP statistics exam upon completion of both semesters of the course. In addition to all of the topics of regular Statistics, this course includes, but is not limited to, two sample hypothesis testing, correlation and regression analysis, variance analysis, and statistical process control. A comprehensive description of this course can be found on the College Board website at <http://apcentral.collegeboard.org/>. **Requirement: Honors Algebra II or regular Algebra II. The College Board recommends students should have PSAT scores of 550+ for math, and critical reading. Students will be required to have access to a graphing calculator. AP Exam registration will take place in September & October. Standard AP fees apply.**

**2544 ADVANCED MATHEMATICS/COLLEGE ALGEBRA (IVY TECH M136) (12)** This is year long, two semester, two credit course that would give a student a more in-depth study of the algebraic properties of expressions, and a variety of functions. Students will explore algebraic properties, variation, quadratic equations, systems of equations, inequalities, exponential, logarithmic, and polynomial functions. Students who enroll may apply to earn three (3) hours of college credit in Mathematics (M136), through Ivy Tech. Students must meet the Ivy Tech prerequisite requirements in order to earn college credit. Transferring credits will vary depending on university requirements. **This course will count as the Pre-Calculus requirement for admission to Indiana University. This course is not designed for students who have successfully completed Pre-Calculus. Requirement: Successful completion of Algebra II.**

---

**\*NOTE FOR ALL OF THE FOLLOWING MATH COURSES:**

*Students will be given a math placement exam in Pre-Calculus. The placement exam and the student's PSAT score will be used to determine which of the following math course(s) the student will find the most success. Should a student wish to enroll into one of the following math course(s) other than the recommendation given to the student and the guidance counselor, parents will be required to sign a waiver regarding the course rigor.*

**2544 ## ADVANCED MATHEMATICS: ACP CALCULUS (BRIEF SURVEY OF CALCULUS) (ACP M119) (11, 12)** This is a college course which will focus on preparation for majors in business and the social sciences. Topics include mathematical modeling, applications of functions using the first and second derivative, and using the definite integral. As part of Indiana University Advance College Project, students who enroll may apply to earn three (3) hours of college credit in Mathematics (M119), through IU Students will be billed at discounted university fees in late fall. Credits are transferable to most colleges and universities throughout the country. Go to <http://acp.indiana.edu/> for more information. Students enrolled through IU will receive dual credit, both high school and IU credit. **Students choosing to take this course, whether for college credit or not, will receive honors grade weight for first semester and dual credit grade weight for the second semester of the course.** IU requirements for admission to this course – GPA 2.7 or higher on a 4.0 scale. Tuition will be determined by IU and will be communicated to students at the beginning of the semester. **Requirement: Successful completion of Pre-Calculus. Students will be required to have access to a graphing calculator.**

**2544 ## ADVANCED MATHEMATICS/FINITE MATH (ACP M118) ( 11, 12 )** This is a college course which will focus on probability models, counting, sets, partitions, tree diagrams, linear models, matrix algebra, Markov chains, interest, mortgage, and financial decision making. As part of Indiana University Advance College Project, students who enroll may apply to earn three (3) hours of college credit in Mathematics (M118), through Indiana University, Bloomington. Students will be billed at discounted university fees in late fall. Credits are transferable to most colleges and universities throughout the country. Go to <http://acp.indiana.edu/> for more information. Students enrolled through IU will receive dual credit, both high school and IU credit. **Students choosing to take this course, whether for college credit or not, will receive honors grade weight for the first semester and dual credit grade weight for the second semester of the course.** This course may be taken at the same time as Calculus. IU requirements for admission to this course – GPA 2.7 or higher on a 4.0 scale within a college preparatory curriculum. Tuition will be determined by IU and will be communicated to students at the beginning of the semester. If applying to Indiana University for an undergraduate program, this course does not count towards the seven required semesters of mathematics for admission. **Requirement: Successful completion of Pre-Calculus / Trigonometry.**

**2562 ## AP CALCULUS AB (11, 12)** This is a year-long rigorous college level course that covers both differential and integral calculus. A comprehensive course description can be found directly on the College Board’s AP Central website at <https://apcentral.collegeboard.org/pdf/ap-calculus-ab-and-bc-course-and-exam-description.pdf>. Successful completion of the AP exam *may* allow students to test out of **one** semester of college calculus and earn college credit depending on the university’s requirement. AB calculus is the **first** semester of a year-long college calculus course. As part of Indiana University Advance College Project, students who enroll may apply to earn four (4) hours of college credit in Mathematics (M211), through Indiana University, Bloomington. Students will be billed at discounted university fees in late fall. Tuition will be determined by IU and will be communicated to students at the beginning of the semester. Go to <http://acp.indiana.edu/> for more information. Students enrolled through IU may receive dual credit, both high school and IU credit. IU requirements for admission to this course – GPA 2.7 or higher on a 4.0 scale within a college preparatory curriculum. **Recommendation: An "A" average over the full year of Pre-Calculus and Trigonometry. Students will be required to have access to a graphing calculator. AP Exam registration will take place in September & October.**

**2572 ## AP CALCULUS BC (11, 12)** This is a year-long rigorous college level course that covers both differential and integral calculus with extended theory and applications. A comprehensive description can be found on the College Board’s AP Central website at this address: <https://apcentral.collegeboard.org/>. Upon successful completion of the AP exam, students may be able to test out of **two** semesters of college calculus and earn college credit depending on the university’s requirement. **Requirement: Honors Pre-Calculus. Students will be required to have access to a graphing calculator. AP Exam registration will take place in September & October. Standard AP fees apply.**

**2544 \* ## MULTIVARIABLE CALCULUS AND ITS APPLICATIONS (12)** Topics include three-dimensional vector calculus, Gauss’s theorem, Green’s theorem, and Stoke’s theorem. This course includes the use of graphing calculators and computer software. This one semester course is offered as distance learning through Ball State University. Students will participate during the school day, in the math department chairperson’s classroom. **Requirement: Successful completion of AP Calculus BC. The cost of this course is appx. \$350 plus textbooks.** For more information about BSU Dual Credit, visit the website here: <https://www.bsu.edu/academics/collegesanddepartments/dual-credit>

**2544 \* ## DIFFERENTIAL EQUATIONS (12)** Introduction to nth-order ordinary differential equations, equations of order one, elementary applications, linear equations with constant coefficients, nonhomogeneous equations, undetermined coefficients, variation of parameters, linear systems of equations, and the Laplace transform. This course includes the use of standard computer software. This one semester course is offered as distance learning through Ball State University. Students will participate during the school day, in the math department chairperson’s classroom. **Requirement: Successful completion of Multivariable Calculus. The cost of this course is appx. \$350 plus textbooks.**

\* 1-semester course      \*\* can be taken 1 or 2 semesters      # single-weighted course      ## double-weighted course

# IB MATH COURSES

All IB courses can be taken as individual IB Certificate offerings or as part of the full IB Diploma.

## 2590 ## IB MATHEMATICS: ANALYSIS AND APPROACHES, HIGHER LEVEL (MATH AA HL)

The two-year IB Mathematics: Analysis and Approaches (HL) course is intended for students who wish to pursue studies in mathematics at university or subjects that have a large mathematical content. Students will explore topics in greater depth and go *beyond* the Indiana state standards of both Calculus and Statistics. Students planning to study engineering, high-level physics, or mathematics are encouraged to enroll. IB Math AA is for students who enjoy developing mathematical arguments, problem solving, and exploring real and abstract applications, with and without technology. Core topics provide students the opportunity to engage in detailed study of numbers and algebra, functions, geometry and trigonometry, statistics and probability, and calculus. See more info at: <https://www.ibo.org/>. **Due to the integrated nature of IB curriculum and objectives, optional field trips may take place during this course. Any associated fees will be shared by instructors in advance. Requirement: Successful completion of Honors Pre-Calculus.**

## 2588 ## IB MATHEMATICS: ANALYSIS AND APPROACHES, STANDARD LEVEL (MATH AA SL)

The two-year IB Mathematics: Analysis and Approaches (SL) course is intended for students who wish to pursue studies in mathematics at university or subjects that have a large mathematical content. Students will explore topics in greater depth and go *beyond* the Indiana state standards of mathematics in both Calculus and Statistics. Students planning to study engineering, high-level physics, or mathematics are encouraged to enroll. IB Math AA is for students who enjoy developing mathematical arguments, problem solving, and exploring real and abstract applications, with and without technology. Core topics provide students the opportunity to engage in detailed study of numbers and algebra, functions, geometry and trigonometry, statistics and probability, and calculus. See more info at: <https://www.ibo.org/>. **Due to the integrated nature of IB curriculum and objectives, optional field trips may take place during this course. Any associated fees will be shared by instructors in advance. Requirement: Successful completion of Pre-Calculus.**

## 2594 ## IB MATHEMATICS: APPLICATIONS AND INTERPRETATIONS, HIGHER LEVEL (MATH APPS HL)

The two-year IB Mathematics: Applications and Interpretations (HL) course is designed for students who enjoy describing the real world and solving practical problems using mathematics, those who are interested in harnessing the power of technology alongside exploring mathematical models, and who enjoy the more practical side of mathematics. Students will meet the Indiana state standards of mathematics in both Calculus and Statistics. This course will prepare students for future studies in computer science, chemistry, economics, psychology, and business administration. Students will develop independence in their mathematical learning by investigation and mathematical modeling. Core topics provide students the opportunity to engage in detailed study of numbers and algebra, functions, geometry and trigonometry, statistics and probability, and calculus. More information can be found at: <https://www.ibo.org/>. **Due to the integrated nature of IB curriculum and objectives, optional field trips may take place during this course. Any associated fees will be shared by instructors in advance. Requirement: Successful completion of Honors Algebra II.**

## 2592 ## IB MATHEMATICS: APPLICATIONS AND INTERPRETATIONS, STANDARD LEVEL (MATH APPS SL)

The two-year IB Mathematics: Applications and Interpretations (SL) course is designed for students who enjoy describing the real world and solving practical problems using mathematics, those who are interested in harnessing the power of technology alongside exploring mathematical models, and who enjoy the more practical side of mathematics. This course will prepare students for future studies in computer science, chemistry, economics, psychology, business administration, humanities, and liberal arts fields. Core topics provide students the opportunity to engage in detailed study of numbers and algebra, functions, geometry and trigonometry, statistics and probability, and calculus. More information can be found at: <https://www.ibo.org/>. **Due to the integrated nature of IB curriculum and objectives, optional field trips may take place during this course. Any associated fees will be shared by instructors in advance. Requirement: Successful completion of Algebra II.**

\* 1-semester course

\*\* can be taken 1 or 2 semesters

# single-weighted course

## double-weighted course