

MATHEMATICS

The mathematics curriculum consists of courses designed to enable students to develop accuracy and facility in performing fundamental mathematical operations and to develop an understanding of the nature and structure of mathematics so that students will be able to apply the basic principles to a wide variety of situations. The curriculum includes concepts and processes of modern mathematics upon which technical and scientific progress depend. Provisions are made for students to develop competence in such activities as solving problems, writing proofs, organizing data and other information, and drawing conclusions, both scientific and general. Calculators and other forms of technology are used throughout the mathematics curriculum.

Algebra 1 (Advanced, Academic, Studies)

5.0 credits

Prerequisite: none

Algebra 1 is a course designed to help students develop an understanding and appreciation of the basic algebraic structure of the real number system. Some of the topics studied are: properties of numbers, factoring, fractions, equations, open sentences, exponents, radicals, inequalities, graphing and quadratics. Problem solving is integrated into the study of each of the many different kinds of open sentences. Algebra 1 is the first course of a sequential math program designed for students from grades 9 to 12.

Geometry

(Honors/Pre IB, Advanced, Academic, Studies)

5.0 credits

Prerequisite: Algebra 1

This course is designed to help the student discover, by means of logical thought processes, important facts concerning figures in two and three dimensions, and to develop these facts showing their relationships to one another and their applications to problem-solving. Major topics include: congruence, similarity, geometric transformations, geometric inequalities, parallel and perpendicular lines, planes, polygons, circles, areas and volumes, vectors, and coordinate geometry. The depth to which each topic is covered and the sophistication of the solutions to the problems related to those topics increases with the level of the course.

Algebra 2 (Honors/Pre IB, Adv, Acad, Studies)

5.0 credits

Prerequisites: Algebra 1 and Geometry

Algebra 2 is a second course in the study of level appropriate algebra. It begins with a review of the material covered in Algebra 1 and leads to a comprehensive study of functions, linear, quadratic, polynomial, logarithmic, exponential and trigonometric functions. Other topics may include: systems of equations and inequalities, matrices, powers, function transformations, sequences and series, conic sections, rational and complex numbers. Applications provide for reinforcement and expansion of algebraic principles previously learned.

Pre-Calculus (IB/Honors)

5.0 credits

Prerequisites: Algebra 2 Honors/Pre IB or Algebra 2 Advanced or Algebra 3/Trig with teacher recommendation

This course is designed for the student who has shown a markedly superior mathematical aptitude. Before enrolling in this program the student should have completed Algebra 2 (Honors/Pre IB or Advanced) or Algebra 3/Trig. Pre-Calculus is an elementary course in functions that includes the following topics: plane analytic geometry, algebra of functions, series and sequences, limits, rate of change of a function, derivatives, polynomial functions, transcendental functions, complex numbers, math induction, trigonometry, statistics and probability.

All students will complete portfolio problems as part of their assessment for the course. The portfolio problems of the students enrolled in the IB Diploma program will be evaluated by the IB organization, in addition to being assessed internally by the instructor of the course.

NOTE: In order to take the IB test in the senior year, students must take Pre-Calculus as juniors and Calculus (IB) or Calculus BC (AP / IB-HL).

Algebra 3 and Trigonometry (Advanced)

5.0 credits

Prerequisite: Alg 2 Adv or teacher recommendation

This course is designed for students with special mathematical aptitude and interest. Trigonometric topics that are studied include: functions, graphs, equations, inverse functions, angle identities, simplifying expressions, proving identities, and solution of triangles. Algebra topics that are studied include: combinations, permutations, introductory probability and statistics, conic sections, functions, and graphs.

Discrete Math (IB)

5.0 credits

Prerequisites: Algebra 2 and teacher recommendation

NOTE: IB Discrete Math is awarded Advanced credit only.

In this course students will be exposed to a variety of mathematical topics. These include probability and statistics, sequences and series, basic set theory, symbolic logic, and financial mathematics. Traditional topics involving the study of linear, quadratic, exponential, and trigonometric functions will be presented with an emphasis on applications. Elementary procedures from differential calculus will be introduced. The use of graphing calculators and appropriate computer software will be encouraged throughout the course.

Discrete Math is designed to assist students preparing for the IB Studies Level exam and requires a major project (math term paper) to be completed by all students.

Foundations of College Mathematics (Academic)

5.0 credits

Prerequisite: Algebra 2

This course is for seniors who will not major in mathematics or science in college. The major objectives of the course include: reinforcement of algebraic and geometric skills through a study of applications of trigonometry; development of the ability to communicate thoughts through the use of symbolic expressions and graphs; increased competency in distinguishing between relevant and irrelevant data; and acquisition of strategies in applying mathematical techniques in problem-solving. Topics include polynomial functions, exponential functions, trigonometry, statistics and probability.

Calculus (IB)

5.0 credits

Prerequisite: IB Mathematical Analysis or teacher recommendation

This course is designed to encourage students to discover many calculus concepts including: limits and continuity, differentiation, applications of derivatives, integration, applications of integrals, calculus of transcendental functions, techniques of integration, and related rate problems. The course will also prepare students for the International Baccalaureate Methods exam. Topics of focus will include: number systems, sequences and series, logarithms, various functions and their graphs, functions transformations, trigonometry, vectors, the binomial theorem, and probability and statistics.

Full Year Course Electives

Calculus AB (AP)

5.0 credits

Prerequisite: IB Mathematical Analysis and teacher recommendation

The course follows the recommendations of the Commission of Mathematics of the College Entrance Examination Board for the Advanced Placement course of calculus. Emphasis is placed on the understanding of processes, discovery of concepts, and solving application problems utilizing the support functions of graphing calculators. The material of the course is focused on limit theory and continuity, differentiation, applications of derivatives, integration, applications of integrals, calculus of transcendental functions, techniques of integration, and related rate problems. The course will prepare students for the AP Calculus AB exam.

Calculus BC (AP / IB - HL)

6.0 credits

Prerequisite: IB Mathematical Analysis and teacher recommendation

Co-Requisite for International Baccalaureate HL Math students: Statistics AP

This course follows the curriculum recommendations of the Advanced Placement Board for the Calculus (BC) as well as the Higher Level International Baccalaureate curriculum. The calculus curriculum is a thorough study of differential and integral calculus as well as infinite series and polynomial approximations. Included will be a study of topics such as complex number systems, parametric equations, vector systems, matrices, and three dimensional geometry. It is recommended only for students with a keen interest in higher mathematics and will be offered if enrollment is sufficient.

Computer Science (IB)

5.0 credits

IB Computer Science deals with the solving of problems using computers. The emphasis will be on the use of an analytical approach to problem solving using the JAVA programming language. The course will focus on software development, fundamentals of computer systems, and the relationship between computing systems and society.

Full Year Course Electives (continued)

Further Mathematics (Honors / IB) (WMM Only)

5.0 credits

Prerequisites: Honors Pre-Calculus and/or Honors Calculus

Further Mathematics is an IB SL course designed for students who have attained a high degree of competence in a range of analytical and technical skills and who display a considerable interest in mathematics.

The course focused on different branches of mathematics including advanced geometric principles, statistics and probability, sets and relations and groups, series and differential equations, and discrete math. It is designed to allow students to learn a variety of branches of mathematics in depth and also to appreciate practical applications. Further Mathematics can be taken alone as an elective or in addition to Calculus BC.

Statistics (AP)

5.0 credits

Prerequisites: Advanced level math courses and teacher recommendation

This course follows the recommendations of the Advanced Placement Program of the College Board. Emphasis is placed on exploratory analysis of data using graphical and numerical techniques and on the planning of a statistical study. Probability will be studied as a tool for anticipating statistical distributions.

The use of the graphing calculator and computer software packages will be infused throughout the course and be used by students to facilitate simulations of probability experiments, analysis of data, and inferential statistics. This course is a requirement for students who are candidates for the IB HL Mathematics test.

Probability and Statistics (WMM Only) (Advanced)

5.0 credits

Prerequisites: Algebra 1, and Algebra 2, and Geometry at the appropriate level.

This course will emphasize descriptive statistics and analysis of data using all available graphical techniques.

Topics of probability and simulations of experiments which enhance the study of statistics will be included. Topics will be studied through theory and real-life applications. Graphing calculators and computer programs will be used.

Semester Course Electives

Introduction to Computer Programming (Advanced)

2.5 credits 1 semester course

Prerequisites: Algebra 1 (grade of B or higher, or teacher recommendation)

This course satisfies the graduation requirement related to career education and consumer, family, and life skills.

This course is designed to introduce students to the processes involved in using computers to solve problems. It is recommended for those students who are considering the field of computers as a possible career choice, or who will encounter computer-based solutions as an integral part of their field of study. The methodology taught in the course is applicable to problem solving in general.

This course will use a standard software development model, starting with clear a definition of the problem, logical planning and design (including prototyping and pseudo-code), modular program implementations, and systematic debugging, as integral parts of successful software development. Specific topics will include a general hardware overview, basic data types, program control, various input/output methods (text-based and graphical) as well as the social impact of computers.

Probability and Statistics (WMC Only) (Academic)

2.5 credits 1 semester course

Prerequisites: Algebra 1, and Algebra 2, and Geometry at the appropriate level

This course will emphasize descriptive statistics and analysis of data using all available graphical techniques.

Topics of probability and simulations of experiments which enhance the study of statistics will be included. Topics will be studied through theory and real-life applications. Graphing calculators and computer programs will be used.



