MATHEMATICS

The courses offered in the Mathematics Department are designed to give you the necessary experience to prepare for college entrance or entry to the world of work. Three units of mathematics are required for graduation; all courses are applicable toward this requirement. A three-year sequence may be satisfied by any three units of credit earned in this department.

All courses will introduce students to analysis of functions graphically, numerically, algebraically, and verbally and incorporate appropriate use of technology. Those students in Pre-Calculus or Pre-Calculus Honors may be recommended for AP Statistics, AP Calculus AB or AP Calculus BC.

NINTH GRADE COURSES

PRE-ALGEBRA 1 CC

This course is designed to give students a solid foundation in the mathematical concepts needed to prepare them for Algebra 1. Students' arithmetic competence is extended to working with algebraic expressions and solving equations.

1 unit of credit

Prerequisite: Teacher recommendation

ALGEBRA 1 CC

This course, which is the first in the NYS three-year sequence for Mathematics, has algebra as its focal point but includes a strong problem solving component. Data analysis is included. Common Core exam required.

1 unit of credit

Prerequisite: Math 8

ALGEBRA 1 CC LAB

Students recommended by their Math 8 teachers as needing additional instruction to master the concepts and skills of Algebra 1 will take this course concurrently with their Algebra 1 course. This class meets on alternate days.

Prerequisite: Math 8 and teacher recommendation

TENTH GRADE COURSES

GEOMETRY CC

This second course in the New York State three-year sequence for Mathematics will introduce students to the study of geometric relationships. Reasoning and proof will be used formally and informally to illustrate concepts and solve problems. Common Core exam required.

1 unit of credit

Prerequisite: Completion of Algebra and teacher recommendation

GEOMETRY CC LAB

Students recommended by their Algebra 1 teacher as needing additional instruction to master the concepts of geometric relationships. The students take this course concurrently with their Geometry course. The class meets on alternate days.

Prerequisite: Completion of Algebra 1 and teacher recommendation

GEOMETRY CC HONORS

This course is designed for students whose performance in Algebra has been consistently above average and who possess keen mathematical insight. The Geometry content from the New York State syllabus will be covered in depth and with enrichment. Common Core exam required.

1 unit of credit

Prerequisite: Completion of Algebra 1 with a minimum course grade of 90, a minimum of 90 on Algebra Common Core exam and teacher recommendation.

ALGEBRA/GEOMETRY CONNECTIONS

Students recommended by their Algebra 1 teacher as needing additional instruction to fine tune their understanding of Algebra and apply this knowledge to understand the concepts of Geometry will take this course. This course meets once a day. There is no Regents exam at the end of this course.

1 unit of credit

Prerequisite: Completion of Algebra 1 and teacher recommendation

ELEVENTH GRADE COURSES

ALGEBRA 2 CC

This course is the third of the math courses required for the NYS Regents Diploma. The course includes advanced algebra topics, higher order analysis of functions, probability and statistics. The Algebra Common Core Regents exam is required.

1 unit of credit

Prerequisite: Completion of Algebra 1 and Geometry and teacher recommendation

ALGEBRA 2 CC with LAB

Students recommended by their Geometry teachers as needing additional instruction to master the concepts of Algebra2/ Trigonometry will take this course which includes an extra period of Math on alternate days. Regents exam is required.

1 unit of credit

Prerequisite: Completion of Algebra 1 and Geometry and teacher recommendation.

ALGEBRA 2 CC HONORS

This course will contain the third segment in a three year sequence as described by New York State. The accelerated pace of this course will be appropriate for only the most serious and mature mathematics students. Regents exam is required.

1 unit of credit

Prerequisite: Completion of Algebra 1 and Geometry Honors with a grade of 90 or above in each course and in each Regents with teacher recommendation.

ALGEBRA 2.1

This course is the first year of a two year curriculum that examines advanced algebra topics and analysis of various functions. Students who take this course will take the Algebra 2 CC exam in the second year of this course.

1 unit of credit

Prerequisite: Completion of Algebra/Geometry Connections or Geometry CC and teacher recommendation

PRE-CALCULUS HONORS

This course is intended for the student who plans to continue his/her study with AP Calculus in the future. Students who demonstrate a mastery of the topics in algebra and trigonometry should consider this course. Evidence of this mastery would be indicated by

1) A final average of "A" along with a Regents exam grade of at least 90 in Algebra 2 / Trigonometry.
2) Teacher recommendation.

Throughout the course the graphing of functions and relations will be emphasized since the mastery of these skills are essential to the calculus. Among the topics to be studied are: functions - absolute value, polynomial, rational, exponential, logarithmic, trigonometric, and multi-defined -conic sections, polar coordinates, sequences and series, limits and continuity, derivatives and applications of derivatives.

The student should be able to extract application techniques from the concepts taught with minimal guidance from the teacher. Students will be expected to have a mastery of basic and intermediate

textbook problems. Students should anticipate a higher level of challenge in the Pre-Calculus Honors class than in a Pre-Calculus class.

The student will take a departmental final in June.

1 unit of credit

Prerequisite: Grade of 90 or better in Algebra 2 CC honors and teacher recommendation.

TWELFTH GRADE COURSES

ALGEBRA 2.2

This course is the second year of a two year curriculum that examines advanced algebra topics and analysis of various functions. Students who take this course will take the Algebra 2 CC exam at the end of January and will continue with topics of mathematics that will better prepare them for college mathematics.

1 unit of credit

Prerequisite: Completion of Algebra 2.1 and teacher recommendation

COLLEGE MATH

This course has a dual purpose. It will emphasize those topics that typically are required for a first year college algebra course while it uses problem solving skills that are applicable for basic business practices including interest problems for credit cards, loans and mortgages, making decisions based on statistical data and mathematical modeling.

1 unit of credit

Prerequisite: Teacher recommendation

STATISTICS MODELS THE WORLD

Emphasis in this course will be on interpretation of statistics in multiple settings including behavioral sciences, medicine, economics, education, and politics. The graphing calculator will be used extensively in all applications. Concepts to be covered include exploratory data analysis, data collection, probability, and inference.

1 unit of credit

Prerequisite: Completion of Algebra 2 CC with a final average of 75 or better and teacher recommendation

PRE-CALCULUS

A course intended to prepare students for further who plan to take Calculus or college math next year. Topics studied will include but not be limited to: function theory, analytic geometry, curve sketching, limits, continuity and differentiation of algebraic functions. The use of a graphing calculator as a problem-solving tool will be explored.

1 unit of credit

Prerequisite: Passing grade in Algebra 2 CC, and teacher recommendation

CALCULUS HONORS

This course will include the study of functions, techniques of graphing, limits and continuity, the derivative and it applications, techniques and applications of integration. The emphasis of this course will be on real-world uses of the calculus, with less emphasis on theoretical development than in the advanced placement courses.

1 unit of credit

Prerequisite: Completion of Pre-Calculus and teacher recommendation

ADVANCED PLACEMENT MATHEMATICS - CALCULUS AB

This college level course is intended for those students who:

1) Have grade of "A" or "B" in the honors or accelerated sequence.
2) Exhibit a keen insight in mathematics.
3) Have a thorough knowledge of college preparatory mathematics including algebra, axiomatic geometry, trigonometry and analytic geometry.

It is the Department's strong feeling that both intuition and rigor are essential to a proper understanding of mathematics.

The topics covered will include, but are not limited to: Differential Calculus which includes derivatives of polynomial, trigonometry, and logarithmic functions, applications of the derivative such as slope of a curve, curve sketching, velocity and acceleration; Integral Calculus which involves antiderivatives, integration by substitution; the definite integral as a concept of an area, volume, average value of a function, approximating using rectangles or trapezoids, limit of a sum and the fundamental theorem of Calculus.

Students are required to take the Advanced Placement exam in May.

1 unit of credit

Prerequisite: Successful completion of Pre-Calculus Honors or Pre-Calculus with Department recommendation

Those not receiving the department recommendation will be required to meet with counselor, department head, and parents to ensure full awareness of the high level of commitment and skill required to succeed in AP Calculus AB.

ADVANCED PLACEMENT MATHEMATICS - CALCULUS BC

The BC Advanced Placement Calculus course is the most rigorous course in the AP Math curriculum. This is a college level course to be chosen by students with:

1) Grades of "A" in the honor sequence.
2) A thorough knowledge of algebra, geometry, trigonometry, elementary functions and analytic geometry.
3) The ability to comprehend new mathematical techniques and concepts on a daily basis.

4) The ability to work clearly and accurately with problems that are multi-faceted.

5) The ability to discuss math problems, along with solutions provided by fellow students; the time, energy and commitment to devote to a demanding, in depth, intellectually challenging course.

All of the topics in Calculus AB are covered. In addition, sequences and series, vector functions, polar functions, arc length, improper integrals, greater depth in limits, integration and other topics. The College Board description generalizes: Calculus AB is given a full year's college credit and Calculus BC is designed for placement one college semester beyond that.

Students are required to take the Advanced Placement exam in May.

1 unit of credit

Prerequisite: Successful completion of Pre-Calculus Honors or AB Calculus with Department recommendation

Those not receiving the department recommendation will be required to meet with counselor, department head, and parents to ensure full awareness of the high level of commitment and skill required to succeed in AP Calculus BC.

ADVANCED PLACEMENT MATHEMATICS – STATISTICS

This college level course is intended for those students who:

1) Have completed Algebra 2 Honors or Pre-Calculus with minimum grade of 90 and have the recommendation of their teacher or have completed Algebra 2 with a minimum grade of 95 with both teacher and department chairperson recommendation.

2) Exhibit mathematical insight

The topics for AP Statistics are divided into four major themes: exploratory analysis, planning a study, probability, and statistical inference. This course adheres to the philosophy and methods of modern data analysis; use of computers and graphing calculators is essential.

Important components of the course in addition to lecture and reading of the textbook will include use of technology, projects and laboratories, cooperative group problem solving, and writing as a part of concept-oriented instruction and assessment.

1 unit of credit

Prerequisite: Algebra 2 Honors or Pre-Calculus with a minimum grade of 90 with teacher recommendation or Algebra 2 with a minimum grade of 95 with both teacher and Department Chairperson recommendation.

Those not receiving the department recommendation will be required to meet with counselor, department head, and parents to ensure full awareness of the high level of commitment and skill required to succeed in AP Statistics.

ADVANCED TOPICS IN MATHEMATICS

This course is a half-year elective in math, with the option of taking the course in both semesters. Topics covered in the first semester will not be repeated in the second. The topics introduced will be independent of the Pre-Calculus/Calculus curriculums and will not require prerequisite knowledge from those courses.

This course is designed for advanced students who wish to examine some non-traditional high school math topics including linear algebra, number theory, mathematical induction, number systems, non-Euclidean geometry, graph theory and combinatorics.

½ unit of credit each semester

Prerequisite: Completion of Pre-Calculus or Pre-Calculus Honors. Teacher recommendation required.

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ROBOTICS 1

This course will introduce students to the field of robotics and curriculum will focus on electronic, mathematical, and physics-based concepts. Programming and building robots require the use of science, technology, engineering and math (STEM) applications. Students will also learn fundamental programming concepts and scientific method and inquiry techniques. The robotics industry will be explored and students may have the opportunity to participate in robotics competitions.

½ unit of credit

Prerequisite: None but Priority given to 11^{th} & 12^{th} graders

ROBOTICS 2

This course will provide an in-depth study of the field of robotics and the curriculum will focus on electronic, mathematical, and physics-based concepts. Programming and building robots requires the use of science, technology, engineering and math (STEM) applications. Student will also learn fundamental programming concepts and scientific method and inquiry techniques. The robotics industry will be explored and students may have the opportunity to participate in robotics competitions.

½ unit of credit

Prerequisite: Successful completion of Robotics 1