

MATHEMATICS

In accordance with New York State requirements, all students will be required to take three years of Mathematics and pass the Algebra 1 Regents examination.

Students who wish to receive an Advanced Designation Regents Diploma will take three years of Mathematics and must also pass the Geometry and Algebra 2 Regents examinations.

GRADE	COURSES	COURSES	COURSES	COURSES	CS COURSES
8	Algebra I ↓				
9	Geometry ↓	Algebra I ↓	Algebra I ↓	Intro To Alg ↓	Intro To CS ↓
10	Algebra 2 ↓	Geometry ↓	Geometry OR App Geometry ↓	Algebra I ↓	AP CSP ↓
11	Pre-Calculus* ↓	Algebra 2 ↓	Trig/Alg 2 ↓	Geometry OR App Geometry ↓	AP CS-A or Visual Basic ↓
12	Calculus 1* Statistics*	Pre-Calculus* Statistics*	Algebra 2	Algebra 2 OR Trig/Alg 2	Comp Prog OR Visual Basic

- *Students have the option to earn college credit in these courses for additional fees.
- Students can earn Advanced Placement (AP) credit in the following courses: Calculus 1, Statistics, Pre-Calculus, CSP, and CS-A.
- Additional math courses bearing one-half school credit each:
Basic Practice of Statistics, Data Science 101, Problem Solving,
Advanced Algebra with Financial Applications – 101 & 102 (AAFA 101 & AAFA 102),
Trigonometry, Introduction to Computer Science, Computer Programming, and Visual Basic.
- Additional math courses bearing one school credit each:
AP Calculus (AB), Calculus 1 (SUPA), AP Statistics, AP Computer Science Principles,
AP Computer Science A (Java), Accounting, Advanced Accounting, and Business Math.

INTRODUCTION TO ALGEBRA (3400)40 weeks - 1 credit (*currently not approved NCAA course*)*Open to Grade 9*

Local Final Exam

Prerequisite: Recommendation of Middle School teachers and school counselor

This course will provide a foundation for Algebra for students with weak mathematical skills. Topics included in this course are: rational numbers, variable expressions, introduction to equations and inequalities, graphing on the coordinate plane, ratio and proportion, algebraic applications of geometry, probability and statistics.

ALGEBRA 1 (3402)

40 weeks - 1 credit

Open to Grades 9, 10, 11, 12

Regents Exam

Prerequisite: None

Algebra 1 is typically the first mathematics course in high school. Topics include: operations with real numbers, number properties and number systems, simple algebraic expressions, first degree equations, linear equations, systems of linear equations, set theory, ratio and proportion, statistics, solving word problems algebraically, using algebra in geometric formulas, operations with exponents, solving inequalities, logic, operations with algebraic expressions, special products and factors, algebraic fractions, radicals, quadratic equations. This course will assist students in developing skills and processes that can be applied using a variety of techniques to successfully solve problems in a variety of settings and content areas. **Students will take the Algebra 1 New York State Regents examination at the end of the school year.**

Since the Algebra 1 examination will allow the use of a graphing calculator, a TI-NSPIRE graphing calculator is recommended for use and will be used for instructional purposes in all Algebra 1 classrooms.

GEOMETRY (3404)

40 weeks – 1 credit

Open to Grades 9, 10, 11, 12

Regents Exam

Prerequisite: Algebra 1 credit earned

This course will provide an integrated study of geometry with algebraic applications and will include geometry of the circle, transformations, similar figures, trigonometry, polygons, constructions and solid geometry based on the common core standards. Students will also utilize given hypotheses to arrive at conclusions using a logical step-by-step process.

Students will take the Geometry New York State Regents examination at the end of the school year.

Since the Geometry examination will allow the use of a graphing calculator, a TI-NSPIRE graphing calculator is recommended for use and will be used for instructional purposes in all Geometry classrooms.

APPLIED GEOMETRY (3406)40 weeks – 1 credit (*currently not approved NCAA course*)*Open to Grades 10, 11, 12*

Local Exam

Prerequisite: Algebra 1 credit earned

This course will provide an integrated study of geometry with algebraic applications and will include transformations, similar figures, trigonometry, geometry of the circle, the study of various polygons, and solid geometry. Coursework will be aligned to the Geometry curriculum (without proofs) to allow students the opportunity to take the following year, if desired. A local final exam will be given in June.

ALGEBRA 2 (3420)

40 weeks – 1 credit

Open to Grades 10, 11, 12

Regents Exam

Prerequisite: Passing Algebra 1, Algebra 1 Regents Exam, and Geometry. Suggested that Geometry Regents Exam be passed.

****Algebra 1 & Geometry exam grades of 85 or better recommended**

This course will review and study in more depth the main topics in Algebra and Geometry, focusing on many aspects of functions. The course includes exponential and logarithmic functions, radical, quadratic and polynomial functions, transformations of functions, series and sequences, as well as statistics and probability. **Students will take the Algebra 2 Regents Exam at the end of this course.**

Since the Algebra 2 examination will allow the use of a graphing calculator, a TI-NSPIRE graphing calculator is recommended for use and will be used for instructional purposes in all Algebra 2 classrooms.

TRIG/ALGEBRA 2 (3421)

40 weeks – 1 credit

Open to Grades 10, 11, 12

Local Exam

Prerequisite: Algebra 1 and Geometry credits earned

Topics included in this course are: continued use of the TI-NSPIRE graphing calculator, data analysis, statistics and probability, quadratic, exponential, logarithmic and power functions, transformational geometry, logic, and algebraic applications. Coursework will be aligned to the common core Algebra 2 curriculum to allow students to take Algebra 2 the following year, if desired.

PRE-CALCULUS (3433)

40 weeks - 1 HS credit and 4 credits issued by SUNY Erie

Open to Grades 11, 12

Local Exam

Prerequisite: Algebra 2 credit earned

This course is designed to prepare the student to successfully complete any college freshmen level mathematics course. The course includes the study of: algebra, the binomial theorem, analytic geometry, linear functions, quadratic functions, polynomial functions, the remainder and factor theorems, inverse functions, exponential and logarithmic functions, circular functions, trigonometric functions, trigonometric identities, matrices, mathematical induction, limits, introduction to differential and integral calculus, curve sketching, maximum-minimum problems, and the fundamental theorem of calculus. It also includes polar and parametric graphing and applications, and vectors and applications. Success in a calculus course depends upon having acquired a thorough understanding of functions, and therefore, there will be a considerable emphasis in this course on functions and their graphs. A TI-NSPIRE will be used during the course of the year.

BUSINESS MATHEMATICS (9003)40 week – 1 credit (*currently not approved NCAA course*)*Open to Grades 9, 10, 11, 12*

Local Exam

Topics covered provide a broad introduction to the business content and terminology that will be studied in greater detail in advanced business classes. Some of the topics are: Basic Mathematics; The Paycheck (overtime pay, fringe benefits); Money Records (checkbook, bank statements); Home Expenses (your first apartment); Transportation (car insurance); Borrowing Money (college); Budgeting and Buying; Owning a Small Business. Work in this course is project-based.

THE BASIC PRACTICE OF STATISTICS (3456)

20 weeks – 1/2 credit

Open to Grades 11, 12

Local Exam

Prerequisites: Algebra 1 & Geometry

This course is an introduction to the increasingly prevalent use of statistics in various professions, public policy and everyday life. Students will learn the basics of data production, data analysis and statistical inference. This engaging activities-based course will provide students with techniques that will help them organize, describe and display data that will yield interesting conclusions.

DATA SCIENCE 101 (3461)
20 weeks – 1/2 credit

Open to Grades 10, 11, 12

Prerequisite: Algebra I, Geometry

This course will develop skills in data science by emphasizing a modeling approach. Students will learn to use data and modeling to answer questions and to critically evaluate information. This is achieved, in part, by embedding opportunities for students to engage in productive struggle, deliberate practice, and practicing explicit connections between concepts into the structure of the course and its textbook. The goals of the course are for students to develop the habits of mind of a data scientist, such that they can problem solve flexibly with data in a variety of situations. The course also aims to develop the practical skills needed across the stages of the data science cycle, including data collection, analyses, and communication of results. Furthermore, a significant goal of the course is to provide students with skills that are future-oriented and tied to the real-world so that they are better equipped for their future careers. This course is applicable to various fields including but not limited to: education, healthcare, digital marketing and advertising, banking, finance, gaming, sports, and logistics. This course will also build upon knowledge from the Basic Practice of Statistics.

ADVANCED PLACEMENT STATISTICS (3440)
40 weeks – 1 HS credit and 3 credits issued by Hilbert College

Open to Grades 11, 12
AP Exam

Prerequisite: Algebra 1 and Academic Advisement

Topics include; organizing data, averages and variations, probability theory, distributions (binomial, normal, sampling, chi-square and F), estimation, hypothesis testing, regression and correlation, and non-parametric statistics. Statistics is appropriate for careers in education, the allied health fields, business, economics, engineering, the humanities, the physical sciences, journalism, communications and liberal arts. Technology will include use of the TI-NSPIRE graphing calculator. **All students are required to take the AP Examination in May if not enrolled through Hilbert College.**

ADVANCED PLACEMENT CALCULUS (AB) (3447)

40 weeks – 1 credit

Open to Grade 12

AP Exam

**Prerequisite: Algebra 1, Geometry, Algebra 2,
Pre-Calculus recommended, an 85 average & Academic Advisement**

Advanced Placement Calculus AB is an in-depth study of Calculus (Differential and Integral). The course is generally designed for those students who began our accelerated mathematics program by completing Pre-Calculus by the end of their junior year. Study will be geared to the Advanced Placement Test given in May. The syllabus will follow that of the Advanced Placement program and may result in up to one semester of college credit. **All students are required to take the AP Examination in May and a class final exam.**

CALCULUS 1 (MAT 295) (3448)

40 weeks – 1 HS credit and 4 credits issued by Syracuse University

Open to Grade 12

Local Exam

**Prerequisite: Algebra 1, Geometry, Algebra 2,
Pre-Calculus recommended, an 85 average, & Academic Advisement**

Calculus 1 is a college level course offered by Syracuse University. The course is designed for students who intend to take upper-level mathematic courses after high school, with a post-graduation interest in the sciences or engineering major.

The course covers concepts of functions, limits, differentiation, integration and includes application of these concepts such as graphing sketching, optimization, linearization, and the computation of areas, volumes, and arc length. After successful completion of the course, students will receive college credit from Syracuse University. Any student enrolled in this course will also have the opportunity to challenge the AP Calculus AB Examination in May.

ADVANCED ALGEBRA W/ FINANCIAL APPLICATION 101 (3455)

20 weeks – 1/2 credit

Open to Grades 11,12

Local Exam

**Prerequisite: Algebra 1, Geometry, recommendation of an 85 on Regents
Examinations**

This is a project-based course that builds on your prior knowledge of math concepts that connect algebra to what is going on in your life. AAFA 101 will help you to understand finances in mathematical terms giving you the tools for helping you to learn the time value of money, how to evaluate best business practices, working through investing, banking, credit, income taxes, insurance and budgeting. A departmental final assessment is given at the end of the semester.

ADVANCED ALGEBRA W/ FINANCIAL APPLICATION 102 (3457) *Open to Grades 11, 12*
20 weeks – 1/2 credit Local Exam

Prerequisite: AAFA 101 credit earned

This is a project-based course that builds on AAFA 101 and continues using the materials necessary to make students knowledgeable about their daily financial encounters. Topics include; auto insurance, income taxes, banking investments, stock market investing, health and home owner's insurance, and the algebra and basic geometry that are required to make responsible consumer decisions. A departmental final assessment is given at the end of the semester.

PROBLEM SOLVING (3454) *Open to Grades 11, 12*
20 weeks – 1/2 credit Local Exam

Prerequisite: Algebra 1 & Geometry

This course will provide students with techniques to develop their problem-solving strategies. Students will be asked to demonstrate their mastery of critical listening, critical thinking, and assertive problem-solving processes that result in high quality solutions to problems. Topics will include mathematical applications to problems from business and economics, humanities and social sciences, physical sciences and engineering and life sciences. Students will work collaboratively and will be required to present written and oral explanations of their work.

TRIGONOMETRY (3458) *Open to Grades 10, 11, 12*
20 weeks – 1/2 credit Local Exam

Prerequisite: Algebra 1 Regents Exam and Geometry Regents Exam

This course will provide students with an understanding of Trigonometry. Trigonometry is the study of angles and lengths of triangles, but trigonometric functions have far reaching applications beyond simple studies of triangles. Trigonometry is essential to the study of higher mathematics and to the understanding of many scientific and engineering principles. This course is designed to help prepare students to enroll for a first semester course in many programs in college; like nursing, engineering and the medical field. This will give students a deeper understanding of the concepts they will need in many STEM/STEAM/Skilled trades careers. A departmental final assessment is given at the end of the semester.

INTRODUCTION TO COMPUTER SCIENCE (3459)

20 weeks – 1/2 credit

Open to Grades 9, 10, 11, 12

Local Exam

Students will be introduced to computer programming in a project-based course. The course will teach students the fundamental concepts of computer science through the writing of various applications. Students will use problem-solving skills and logic to create computer programs and applications. The focus of the course will be in the writing and debugging of software. Topics include; data structures, looping, operating systems and number representation.

ADVANCED PLACEMENT COMPUTER SCIENCE PRINCIPLES (3449)

40 weeks – 1 credit

Open to Grades 9, 10, 11, 12

AP Exam

Prerequisite: Algebra 1 credit earned or Intro to Computer Science

Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging, and approachable course that explores many of the foundational ideas of computing so all students understand how these concepts are transforming the world we live in. **All students are required to take the AP Examination in May.**

ADVANCED PLACEMENT COMPUTER SCIENCE A (3460)

40 weeks – 1 credit

Open to Grades 10, 11, 12

AP Exam

Prerequisite: Algebra 1, and Intro to Computer Science or AP CSP

The AP Computer Science A introduces students to computer science through programming. Fundamental topics in this course include the design of solutions to problems, the use of data structures to organize large sets of data, the development and implementation of algorithms to process data and discover new information, the analysis of potential solutions, and the ethical and social implications of computing systems. The course emphasizes object-oriented programming and design using the Java programming language. **All students are required to take the AP Examination in May.**

COMPUTER PROGRAMMING (3450)

20 weeks -1/2 credit

Open to Grades 11, 12

Local Exam

Prerequisite: Algebra 1, Geometry, and Intro to Computer Science or AP CSP

This course will teach the beginning skills of programming using the language C++. The course will begin with a brief history of the C++ language and some basic math using the binary number system.

The first programs written will include the use of variables, remarks, math and string operators and introductory output commands. These programs are then expanded to include the use of control loops. To produce more advanced programs, the use of arrays and fundamentals such as sorting and searching will be presented.

VISUAL BASIC (3452)

20 weeks -1/2 credit

Open to Grades 11, 12

Local Exam

Prerequisite: Algebra 1, Geometry, and Intro to Computer Science or AP CSP

This course will be an introduction to the programming language Visual basic. Visual Basic (VB) is an event-driven programming language and environment from Microsoft that provides a graphical user interface (GUI) which allows programmers to modify code by simply dragging and dropping controls onto a form. It is easy to learn even without programming basics. Visual Basic is a programming language which does not need you to know any programming language to be able to learn it. Students need logical thinking and a willingness to automate tasks.