

MATHEMATICS

The Mathematics Department offers a variety of courses designed to meet the needs, interests, and abilities of a wide range of students. Most college intending students study mathematics for at least three years. In fact, the majority of four-year universities require for admission three years of mathematics in the Standard or Honors Level Program. Listed below are the NCHS and NCWHS Mathematics courses and some typical Mathematics course sequences.

Grade 9	Grade 10
Advanced Topics in Geometry [H] Geometry Algebra Elementary Algebra I [B] Activities in Algebra I [B]	Advanced Topics in Analytic Algebra [H] Geometry Elementary Geometry [B] Elementary Algebra II [B] Activities in Algebra II [B] Computer Science (Pascal) (1/2)
Grade 11	Grade 12
Pre-Calculus Analytic Algebra Elementary Analytic Algebra [B] College Algebra II (1st Semester) College Algebra II with Trigonometry Advanced Placement Computer Science (C++)	Advanced Placement Calculus Finite Mathematics (1st Semester) Probability & Statistics (2nd Semester) Trigonometry (1/2)

Weighted Grades: [H] - Honors [B] - Base All not listed under Honors or Base are Standard Level

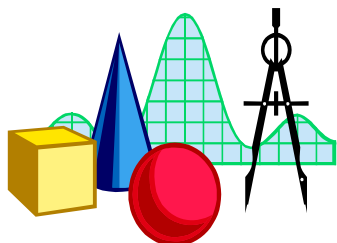
TYPICAL NCHS AND NCWHS MATHEMATICS SEQUENCES

Strong College Prep Sequence

Advanced Topics in Geometry [H]
Advanced Topics in Analytic Algebra [H]
Computer Science (Pascal) (1/2)
Advanced Placement Computer Science (C++)
Pre-Calculus and/or Finite Mathematics (1/2)/
Probability & Statistics (1/2)
Advanced Placement Calculus

Possible College Prep Sequence

Elementary Algebra I [B]
Elementary Algebra II [B]
Elementary Geometry [B]
Elementary Analytic Algebra [B]
College Algebra I (1/2)
College Algebra II with Trigonometry (1/2)



College Prep Sequence

Algebra
Geometry
Analytic Algebra
Finite Mathematics (1/2)/Probability & Statistics (1/2)
and/or Pre-Calculus
Trigonometry (1/2)
Computer Science (Pascal) (1/2)

Two Year Graduation Requirement

Activities in Algebra I [B]
Activities in Algebra II [B]
or
Elementary Algebra I [B]
Elementary Algebra II [B]
or
Activities in Algebra II [B]
Elementary Algebra I [B]
or
Algebra
Geometry

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The answers to some typical questions follow:

Question: **What Mathematics is required for high school graduation?**

Answer: Two years of Mathematics is required to graduate from either NCHS or NCWHS.

Question: **Do Base Level Courses count toward meeting admission requirements to four-year universities?**

Answer: Taken together, the two Base Level Courses Elementary Algebra I and Elementary Algebra II count as one year of Algebra when attempting to meet college entrance requirements.

Question: **How can interested students vertically accelerate?**

Answer: Some time during the first two years of high school, students can take two math courses. Also, students may attempt to proficiency out of Advanced Topics in Analytic Algebra or Pre-Calculus by taking one of those proficiency exams. These exams are given each year in August. Arrangements to take a proficiency exam must be made with the department building chairman in May,

Question: **How far can a gifted student go in mathematics at NCHS or NCWHS? Is there anything offered at the university level?**

Answer: Both Advanced Placement Calculus, which is similar to Calculus I at the university level, and Advanced Placement Computer Science (C++) are available for those students meeting the prerequisites. Some gifted students have taken college courses at local universities.

Question: **Should a student take Pre-Calculus or Finite Mathematics and Probability and Statistics?**

Answer: It all depends upon a student's college choice and intended major. Pre-Calculus should be taken by students who will enroll in Calculus in high school or college. Students need to check in their prospective college catalogs. Engineering, medicine, mathematics, physics or other heavy mathematics related majors should study Pre-Calculus. Students who plan to study accounting, computer science, business administration, marketing, economics, law, social science, education, nurse's training, or liberal arts will find Finite Mathematics and Probability and Statistics useful.

Question: **What kind of help is available for students who are struggling?**

Answer: A student experiencing difficulty should first seek help from his/her teacher. Both NCHS and NCWHS math staff members have lists of students who are able to tutor. Also, math staff members have names of adults who can tutor.

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NOTE: All prerequisite grades listed are semester grades for both semesters. The number following the credit allotment indicates the grade level for which a course is intended; however, students at other grade levels may request these courses, as well.

MAT 083 ACTIVITIES IN ALGEBRA I (Yearly 1 Credit) (9) (Base Level)

Prerequisite: Completion of 8th Grade Mathematics

Activities in Algebra I is a course for students who experience great difficulty in Math 8 or Activities in Math 8. Solving practical problems and improving computation skills are emphasized. Activities in Algebra I is designed to provide the student with the mathematical skills necessary to function in society. Successful completion of Activities in Algebra I satisfies one-half of the NCHS or NCWHS mathematics graduation requirement. **This course is not intended for students who plan to attend either a community college or four-year college.**

MAT 123 ACTIVITIES IN ALGEBRA II (Yearly 1 Credit) (10) (Base Level)

Prerequisite: Grade of A, B, C, or D in Activities in Algebra I; or Grade of D or F in Elementary Algebra I

Activities in Algebra II is a course for students who have successfully completed Activities in Algebra I. It continues improving computation skills as well as introducing taxes, checking and savings accounts, owning a car, and purchasing a home. Successful completion of Activities in Algebra II satisfies one-half the NCHS or NCWHS mathematics graduation requirement. **This course is not intended for students who plan to attend either a community college or a four-year college.**

MAT 163 ELEMENTARY ALGEBRA I (Yearly 1 Credit) (9, 10) (Base Level)

Prerequisite: Grade of A, B, or C in Activities in Math 8; or Grade of D in 8th Grade Mathematics; or Grade of F in First Semester Algebra

Elementary Algebra I is for anyone who has experienced difficulty with math in the past. Solving equations and inequalities are a large part of this base level course. The algebraic processes discussed are covered at a slower pace than in Algebra.

MAT 243 ELEMENTARY ALGEBRA II (Yearly 1 Credit) (10, 11) (Base Level)

Prerequisite: A Passing Grade in Elementary Algebra I; or Grade of F in Second Semester Algebra

Elementary Algebra II is for anyone who has successfully completed Elementary Algebra I. This base level course is the second year of the two-year slow paced Algebra program. Emphasis is placed on polynomials, factoring, linear equations in two variables, rational expressions, and radicals.

MAT 323 ALGEBRA (Yearly 1 Credit) (9)

Prerequisite: Grade C or D in Advanced Topics in Algebra 8; or Grade of A, B, or C in Math 8

Using variables or letters to represent numbers Algebra is generalized arithmetic. Emphasis is placed on solving equations and inequalities, polynomials, factoring, linear equations in two variables, rational expressions, and radicals. Algebra provides the background for the future study of more complex mathematics. Successful completion of this course provides the student with the algebraic skills necessary to study Elementary Geometry or Geometry.

MAT 443 ELEMENTARY GEOMETRY (Yearly 1 Credit) (10, 11) (Base Level)

Prerequisite: Grade of A, B, C, or D in Algebra; or Grade of A, B, or C in Elementary Algebra II

Elementary Geometry is for anyone who has experienced difficulty with math in the past. In this base level course various geometric relationships are studied. Geometric proof is studied in a nonrigorous manner. **This course is not designed for students who intend to take further math courses or who plan to attend a four-year university immediately after graduation.**

MAT 523 GEOMETRY (Yearly 1 Credit) (9, 10)

Prerequisite: Grade of A, B, or C in Algebra; or Grade of C in Advanced Topics in Algebra 8

Geometry is for anyone who intends to take further mathematics courses. In Geometry algebraic concepts such as solving equations and properties of square roots are used and reinforced. Triangle relationships, area, perimeter, volume, similarity, construction and proof are some of the topics emphasized. Successful completion of this course enables a student to study Analytic Algebra or Advanced Topics in Analytic Algebra.

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MAT 603 ADVANCED TOPICS IN GEOMETRY

(Yearly 1 Credit) (9) (Honors Level)

Prerequisite: Grade of A or B in Advanced Topics in Algebra

This course is for anyone who has experienced a high degree of success in mathematics and plans to study at least two more years of high school math. Emphasis in this honors level course is placed upon reading and analyzing various relationships between sets of points on a plane and in space. Students are encouraged to arrive at independent conclusions, testing each conclusion with known properties to choose the correct alternative. Independence of thought, logic, and scientific reasoning are stressed throughout the course. A graphing calculator is suggested.

MAT 643 ELEMENTARY ANALYTICAL ALGEBRA

(Yearly 1 Credit) (11, 12) (Base Level)

Prerequisite: Grade of A, B, C, or D in Geometry; or Grade of A, B, or C in Elementary Geometry

This course is for anyone who has experienced difficulty. Right triangle and circular function trigonometry are introduced. **This course is not designed for students who intends to enroll in Pre-Calculus, Finite Mathematics, or Probability & Statistics or who plans to attend a four-year university immediately after graduation.**

MAT 683 ANALYTIC ALGEBRA

(Yearly 1 Credit) (10, 11)

Prerequisite: Grade of A, B, C, or D in Advanced Topics in Geometry; or Grade of A, B, or C in Geometry

This course is for anyone needing third year math for a college requirement or who plans to take Pre-Calculus, Finite Mathematics, or Probability & Statistics. Emphasis in this class is placed upon expanding the algebraic concepts taught in Freshman Algebra. Right triangle and circular function trigonometry are introduced and refined. Success in Analytic Algebra is largely determined by the amount of individual effort one wishes to put into the course.

MAT 723 ADVANCED TOPICS IN ANALYTIC ALGEBRA

(Yearly 1 Credit) (10, 11) (Honors Level)

Prerequisite: Grade of A, B, or C in Advanced Topics in Geometry; or Grade of A in Geometry

This course is for anyone who has experienced a high degree of success in mathematics and plans to take Pre-Calculus, Finite Mathematics, or Probability & Statistics. Emphasis in this honors level course is placed upon expanding the algebraic concepts taught in Freshman Advanced Topics in with Algebra. In this base level course the algebraic skills taught in Freshman Algebra are reviewed and expanded.

Algebra. Right triangle and circular function trigonometry are introduced and refined. Independence of thought, logic and scientific reasoning are stressed throughout the course. A graphing calculator is suggested.

MAT 741 COLLEGE ALGEBRA I

(First Semester 1/2 Credit) (11, 12)

Prerequisite: Grade of C or D in Analytic Algebra; or Grade of A, B, or C in Elementary Analytic Algebra

This course is designed to assist students in acquiring a more thorough knowledge and proficiency in algebra. It should be considerable value to those who wish to review fundamental principles and applications in anticipation of college placement tests. Topics covered are: graphic and analyzing linear, quadratic, rational, logarithmic and exponential functions. Additional topics could include systems of linear equations and inequalities and matrices. This course is intended for the student who has experienced difficulty in Analytic Algebra or has had success in Elementary Analytic Algebra.

MAT 742 COLLEGE ALGEBRA II WITH TRIGONOMETRY

(Second Semester 1/2 Credit) (11, 12)

Prerequisite: Passing grade in College Algebra I

This course is a continuation of College Algebra I with the addition of the following topics: Trigonometric functions, trigonometric identities and conics. This course is intended for the student who has completed college Algebra I.

MAT 771/772 COMPUTER SCIENCE - PASCAL

(Semester 1/2 Credit) (10, 11, 12)

Prerequisite: Grade of A, B, or C in Advanced Topics in Algebra; or Grade of A or B in Algebra

Computer Science (Pascal) is an introductory programming course in computer development, computer architecture, and computer programming in Pascal. The course is designed to give students a look at a variety of topics in computer science so that they can make informed decisions about their interest in the field, their aptitude for the field, and their desire to further explore the field of programming.

MAT 793 ADVANCED PLACEMENT COMPUTER SCIENCE (C++)

(Yearly 1 Credit) (11, 12)

Prerequisite: Grade of A or B in Computer Science (Pascal) and A, B, or C in Advanced Topics in Analytic Algebra, A or B in Analytic Algebra or Concurrent Enrollment in Advanced Topics in Analytic Algebra or Analytic Algebra

Advanced Placement Computer Science is an accelerated computer programming course that covers the topics

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detailed in the College Board's Advanced Placement Course Description. This course is similar to introductory programming courses at the college level. The content is demanding and will require ample study time. Students enrolled in this course will have the opportunity to take the Advanced Placement Exam in May at their own expense. Depending on their score on the AP exam, they may be eligible for college credit.

MAT 801/802 TRIGONOMETRY (Semester 1/2 Credit) (11, 12)

Prerequisite: Grade of A, B, C, or D in Advanced Topics in Analytic Algebra; or Grade of A, B, or C in Analytic Algebra

Trigonometry is a one semester course that will prepare students to use trigonometric concepts in mathematics and related disciplines. Without the rigor of Pre-Calculus, Finite Mathematics, or Probability & Statistics, Trigonometry could be used to bridge the gap between high school mathematics and freshman college level mathematics. A graphing calculator is suggested.

MAT 841 FINITE MATHEMATICS (Semester 1/2 Credit) (11, 12)

Prerequisite: Grade of A, B, or C in Advanced Topics in Analytic Algebra; or Grade of A or B in Analytic Algebra

Finite Mathematics is for anyone intending to study law, business administration, finance, marketing, accounting, social science, economics, nurse's training, mathematics, or liberal arts. Topics included are linear functions, matrices, systems of linear equations, linear programming, sequences and series, mathematics of finance, and recurrence relations

MAT 842 PROBABILITY & STATISTICS (Semester 1/2 Credit) (11, 12)

Prerequisite: Grade of A, B, or C in Advanced Topics in Analytic Algebra; or Grade of A or B in Analytic Algebra

Probability & Statistics is for anyone intending to study law, business administration, finance, marketing, accounting, social science, economics, nurse's training, mathematics, or liberal arts. Topics included are concepts of probability, simulation, probability distributions, expectations, counting techniques, and descriptive statistics.

MAT 883 PRE-CALCULUS (Yearly 1 Credit) (11, 12)

Prerequisite: Grade of A, B, or C in Advanced Topics in Analytic Algebra; or Grade of A or B in Analytic Algebra; or Score 85% or Above on the Advanced Topics in Analytic Algebra Proficiency Exam

Pre-Calculus is for anyone contemplating majoring in engineering, medicine, mathematics, physics, applied computer science, or other mathematics related area. Anyone intending to take college Calculus should study Pre-Calculus. A rigorous treatment of Analytic Geometry plus an introduction to Calculus topics provides a strong foundation for college Calculus. A graphing calculator is suggested.

MAT 923 ADVANCED PLACEMENT CALCULUS

(Yearly 1 Credit) (11, 12)

Prerequisite: Grade of A, B, or C in Pre-Calculus; or Score 85% or Above on the Pre-Calculus Proficiency Exam

Advanced Placement Calculus is an accelerated math course that covers the topics of functions, limits, derivatives, integrals and their applications as well as analytical geometry. This course is similar to the beginning Calculus course at the college level. Advanced Placement Calculus is open to only those students who have chosen to be vertically accelerated in math and who intend to major in a field at the university level requiring the study of Calculus (not Business Calculus). The content is demanding and will require ample study time. Students enrolled in this course will have the opportunity to take the Advanced Placement Exam in May at their own expense. Depending upon their score on the AP Exam, they may be eligible for college credit. A graphing calculator is suggested.