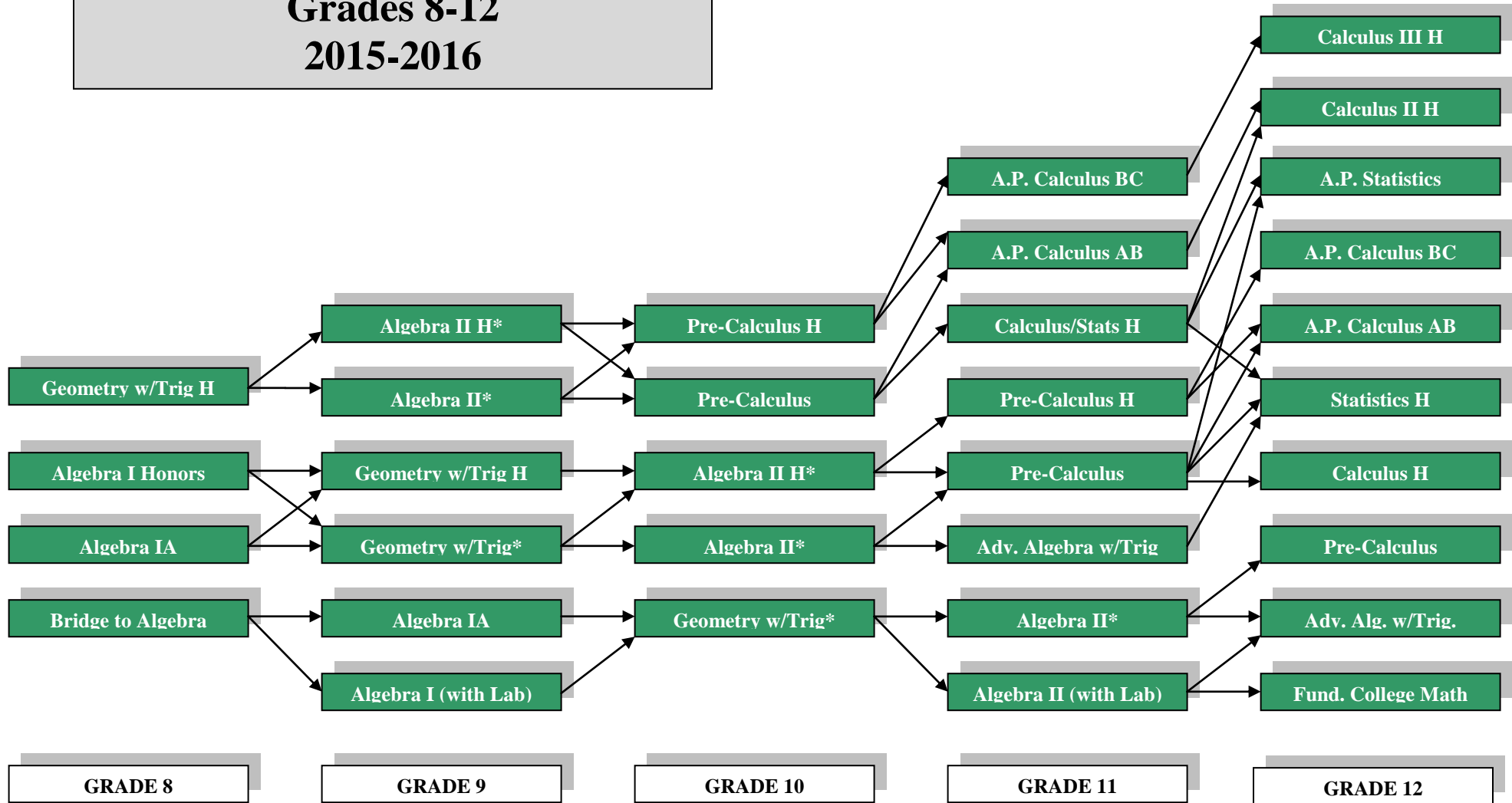


MATHEMATICS COURSES

Grades 8-12

2015-2016



*Indicates a course taught at both CJHS and EBHS

MATHEMATICS

The Mathematics Department offers sequences in academic and honors/advanced placement mathematics that give students opportunities ranging from meeting the minimum three years of mathematics study and state graduation requirements to preparing for or participating in college-level mathematical study. All students must take a course in both algebra and geometry and then depending on pre-high school and high school course selections, students complete their mathematics study with a second level of algebra, pre-calculus, or calculus. In addition, Advanced Placement and college-level courses are offered in calculus and/or statistics as part of the High School Scholars Program. For those students who do not score at the proficient level on state standardized tests, a supplementary lab course may be taken in addition to Algebra II at the high school as well as a math lab course during a student's senior year. Students are strongly encouraged to enroll in a mathematics course in each year of their high school experience as a way of adequately preparing for the High School Proficiency Assessment and college placement as well as their future endeavors. Currently, nearly ninety-seven percent of twelfth graders at East Brunswick High School take a fourth year of mathematics. Because of the sequential nature of mathematics offerings, many courses have prerequisites. In addition, some science courses have mathematics prerequisites. Students need to be aware of the prerequisites for each course and of the grade requirements for continuing in a course sequence. In general, a student needs to receive at least a B- in a given course to remain on that course track. Please see the preceding page for the possible sequence of courses that a student might follow in mathematics from grade 8 through grade 12.

****A waiver form, signed by the Mathematics Supervisor or Mathematics Department Chairperson must be used for any variations. These include enrolling in two mathematics courses in one academic year or taking courses in summer school for advancement. Waiver forms are provided by your School Counselor and are due on or before March 31, 2015 in order to be accepted for the following year.***

CHURCHILL JUNIOR HIGH SCHOOL COURSES

Multiple measures, including standardized test scores, performance and placement in 7th grade math and teacher recommendation, are used to place students into the appropriate level of 8th grade mathematics. In general, a grade of at least “B-“ is required to stay on a given track, while a grade of at least “A-“ is required to move into a new track sequence. *Students are expected to purchase a TI-84 graphing calculator at the beginning of Algebra I as preparation for state standardized tests as well as for future math courses at both Churchill Junior HS and EBHS.*

High School Preparatory Courses:

2167 BRIDGE TO ALGEBRA

5 – 5

Prerequisite: Appropriate score on the 8th grade placement matrix

This course will address pre-algebra topics in a highly differentiated lab environment in which teachers use a variety of teaching strategies such as pre-assessments and monitoring to help guide classroom instruction. All grade eight Common Core State Standards for Mathematics will be addressed in this course through a variety of activities and lessons that focus on problem solving. This includes specific objectives in the areas of Number Sense, Expressions & Equations, Functions, Geometry and Data Analysis. Problem solving will also be a major component of this course via the infusion of *Carnegie Learning Software*. *This course is only offered at Churchill Junior HS.*

2175 ALGEBRA I*

10 – 10

Prerequisite: Bridge to Algebra

This is a grade nine course that helps build foundational algebraic skills and concepts via a highly differentiated classroom environment. The course will be offered as a double period class that will allow students to study concepts through hands-on activities, labs and investigations. Classroom instruction will also include *Carnegie Learning Software* as a supplement that will promote differentiation and individualized student instruction. The course will cover the same unit objectives as in the Algebra I course including Patterns, Equivalence, Lines, Exponentials, Radicals, Quadratics and Data Analysis. Graphing calculators will also be used as a classroom learning and investigation tool. *This course is also offered at East Brunswick High School but meets for only one period a day at EBHS for five credits.*

2176 ALGEBRA IA*

5 – 5

Prerequisite: Grade 8: Appropriate score on the grade eight placement matrix
Grade 9: Placement by Mathematics Department Chairperson

This is a first course in elementary algebra which uses inductive approaches to develop the basic algebraic operations. Topics studied include integers and operations, solving linear equations and inequalities, polynomials, graphing linear and non-linear functions, factoring, fractional equations, irrational numbers, data analysis and verbal/word problems. Problem solving will also be a major component of this course as will the infusion of graphing calculator lessons and activities. *This course is only offered at Churchill Junior HS.*

2172 GEOMETRY WITH TRIGONOMETRY*

5 – 5

Prerequisite: Algebra I or Algebra I Honors

This course develops an understanding of geometry using basic properties, postulates and theorems in the study of triangles, quadrilaterals, and congruence. Other topics include similarity, circles, area, volume, coordinate geometry, transformational geometry, and an introduction to the trigonometric functions and their applications in the right triangle. *This course is also offered at East Brunswick High School.*

2180 ALGEBRA II*

5 – 5

Prerequisite: Completion of one year of Algebra and either Geometry with Trigonometry or Geometry with Trigonometry H

This is a continuation and extension of the concepts studied in Algebra I and Geometry with Trigonometry. New topics include rational exponents, relations and functions, quadratic relations and systems, matrices and determinants, more advanced factoring applications and conic sections. Students enrolled in this course will be expected to purchase either a TI-83+ or TI-84 graphing calculator. These learning tools will be used throughout the course as a means of problem solving and investigation. *This course is also offered at EBHS.*

Honors Level Courses:**2170 ALGEBRA I H***

5 – 5

Prerequisite: Appropriate score on the placement matrix.

This course, intended for the academically talented student in mathematics, uses inductive approaches to develop the basic algebraic operations. In addition to the topics covered in Algebra I, students will be expected to demonstrate independent thinking as they explore and solve in depth problems related to the applications of the covered topics. Problem solving will also be a major component of this course as will the infusion of graphing calculator lessons and activities. *This course is only offered at Churchill Junior HS.*

2173 GEOMETRY WITH TRIGONOMETRY H*

5 – 5

Prerequisite: Grade 8: Appropriate score on the placement matrix
Grade 9: A final grade of “B-” or better in Algebra I H or a final course grade of “A-” or better in Algebra IA

This course, designed for the mathematically talented student, develops an understanding of more advanced geometric concepts, theorems and topics. In addition to the topics covered in Geometry with Trigonometry, students will be expected to demonstrate independent thinking as they explore and solve in depth problems related to the applications of the covered topics. *This course is only offered at Churchill Junior HS.*

2171 ALGEBRA II H*

5 – 5

Prerequisite: One year each of Algebra and Geometry with Trigonometry at the honors level with a final course grade of “B-” or higher in **BOTH** courses

This course is intended for the academically talented student in mathematics. In addition to the topics covered in Algebra II, students will be expected to demonstrate independent thinking as they explore and solve in depth problems related to the applications of the covered topics. Students enrolled in this course will be expected to purchase either a TI-83+ or TI-84 graphing calculator. These learning tools will be used throughout the course as a means of problem solving and investigation. *This course is also offered at EBHS.*

EAST BRUNSWICK HIGH SCHOOL COURSES

College Preparatory Courses:

1155 ALGEBRA I*

5 – 5

Prerequisite: Placement by Mathematics Department Chairperson

This is a tenth grade course that helps build foundational algebraic skills and concepts via a highly differentiated classroom environment. Students in this course will study concepts through hands-on activities, labs and investigations in addition to direct classroom instruction. The course will also include *Carnegie Learning Software* as a supplement that will help promote differentiation and individualized student instruction. The same unit objectives as in the Algebra I course will be covered including Patterns, Equivalence, Lines, Exponentials, Radicals, Quadratics and Data Analysis. Graphing calculators will also be used as a classroom learning and investigation tool. *This course is also offered at Churchill Junior High School but meets for two periods a day at CJHS.*

1159 GEOMETRY WITH TRIGONOMETRY*

5 – 5

Prerequisite: Algebra IA or Algebra I

This course develops an understanding of geometry using basic properties, postulates and theorems in the study of triangles, quadrilaterals, and congruence. Other topics include similarity, circles, area, volume, coordinate geometry, transformational geometry, and an introduction to the trigonometric functions and their applications in the right triangle. *This course is also offered at CJHS.*

1160 ALGEBRA II*

5 – 5

Prerequisite: Completion of one year of Algebra and either Geometry with Trigonometry or Geometry with Trigonometry H

This is a continuation and extension of the concepts studied in Algebra I and Geometry with Trigonometry. New topics include rational exponents, relations and functions, quadratic relations and systems, matrices and determinants, more advanced factoring applications and conic sections. Students enrolled in this course will be expected to purchase either a TI-83+ or TI-84 graphing calculator. These learning tools will be used throughout the course as a means of problem solving and investigation. *This course is also offered at CJHS.*

1162 ALGEBRA II H*

5 – 5

Prerequisite: One year of Algebra at the honors level and Geometry with Trigonometry H with a final grade of “B-” or higher in **BOTH** courses

One year each of Algebra and Geometry with Trigonometry taken at the academic level with final course grades of “A- or higher in **BOTH** courses

This course is intended for the academically talented student in mathematics. In addition to the topics covered in Algebra II, students will be expected to demonstrate independent thinking as they explore and solve in depth problems related to the applications of the covered topics. Students enrolled in this course will be expected to purchase either a TI-83+ or TI-84 graphing calculator. These learning tools will be used throughout the course as a means of problem solving and investigation. *This course is also offered at CJHS.*

Advanced Courses:

1169 FUNDAMENTALS OF COLLEGE MATHEMATICS*

5 – 5

Prerequisite: Placement by Mathematics Department Chairperson

This course is designed to provide the student with a strong command of the skills and concepts needed for success in entry-level college mathematics courses. The course presents the algebra of functions and trigonometry of the right angle. In addition, one of the primary goals of this course is to prepare the students for the expectations of a college placement test such as the Accuplacer.

1158 ADVANCED ALGEBRA WITH TRIGONOMETRY*

5 – 5

Prerequisite: A passing grade of “C+” or lower in Algebra II

This course includes a review of essential skills from algebra, introduces polynomial, rational, exponential and logarithmic functions, and gives the student an in-depth study of trigonometric functions and their applications. Problem solving and investigation through the use of the graphing calculator is an integral part of this course.

1161 PRE-CALCULUS*

5 – 5

Prerequisite: A grade of “B-” or higher in Algebra II or a passing grade of “C+” or lower in Algebra II H

This course gives the student the necessary background for the study of calculus by providing an extensive study of functions and their graphs. Polynomial, rational, exponential and logarithmic functions are addressed along with the trigonometric functions, trigonometric identities, trigonometric equations, and polar coordinates. Problem solving and investigation through the use of the graphing calculator is an integral part of this course.

Note: This course is not available to students who have completed Advanced Algebra and Trigonometry.

1163 PRE-CALCULUS H WITH LIMITS*

5 – 5

Prerequisite: A grade of “B-” or better in Algebra II H or a final grade of “A+” in Algebra II (1160/2180)

This course is intended for the academically talented student and includes the study of polynomial, rational, exponential, logarithmic and trigonometric functions. In addition, topics from calculus (such as limits, continuity, and an introduction to the derivative) will also be introduced in this course as a precursor for Advanced Placement level Calculus. Problem solving and investigation through the use of the graphing calculator is an integral part of this course.

High School Scholars Program Courses:

1180 STATISTICS H*

5 – 5

Optional 3 College Credits

Prerequisite: Advanced Algebra and Trigonometry (1158) or Pre-Calculus (1161)

*Note: Successful completion of this course with a grade of “C” or better allows students to be eligible for college credits. See **High School Scholars Program, Section II, p. 12** for detailed information.*

This course will familiarize students with mathematical models that occur in more advanced courses and in professions through the use of exploratory data analysis and statistical methods. Topics include descriptive statistics, probability, regression, confidence intervals and an introduction to hypothesis testing. This course also affords students the opportunity to gain experience with college level material and expectations while still enrolled in high school. Please note that while credit is given for this course at the honors level, previous enrollment in honors level math courses is not a prerequisite for this course.

1168 CALCULUS H*

5 – 5

Prerequisite: Pre-Calculus (1161)

Optional 4 College Credits

Note: Successful completion of this course with a grade of “C” or better allows students to be eligible for college credits. See High School Scholars Program, Section II, p. 12 for detailed information.

This is a full year study of the Calculus of algebraic, trigonometric, exponential, and logarithmic functions. Topics include limits, differentiation and its applications, integration and the applications of the definite integral. This course also affords students the opportunity to gain experience with college level material and expectations while still enrolled in high school. Please note that while credit is given for this course at the honors level, previous enrollment in honors level math courses is not a prerequisite for this course.

1183 CALCULUS II H*

5 – 5

Prerequisite: Calculus H (1168) or AP Calculus AB (1164)

Optional 4 College Credits

Note: Successful completion of this course with a grade of “C” or better allows students to be eligible for college credits. See High School Scholars Program, Section II, p. 12 for detailed information.

Honors Calculus II will be offered in partnership with Middlesex County College as part of the High School Senior Experience and its rigor will be consistent with a second semester of college calculus. Honors Calculus II includes the study of transcendental and hyperbolic functions, applications of integration, more sophisticated techniques of integration, simple differential equations, parametric curves and vectors, indeterminate forms, Taylor’s formula, infinite series as well as topics in analytic geometry. Please note that while credit is given for this course at the honors level, previous enrollment in honors level math courses is not a prerequisite for this course.

1182 CALCULUS III H*

5 – 5

Prerequisite: A.P. Calculus BC

Optional 4 College Credits

Note: Successful completion of this course with a grade of “C” or better allows students to be eligible for college credits. See High School Scholars Program, Section II, p. 12 for detailed information.

Honors Calculus III will be offered in partnership with Middlesex County College as part of the High School Senior Experience and its rigor will be consistent with a third semester of college calculus. This course will specifically address advanced topics in calculus. Students will explore the use of multivariable calculus to represent phenomena in three-dimensional space and to analyze functions of more than one variable.

Advanced Placement Courses:**1164 A.P. CALCULUS AB***

5 – 5

Prerequisite: A grade of “C-” or better in Pre-Calculus H, or a final grade of “A-” or higher in Pre-Calculus

This college-level course stresses elementary functions and analytic geometry as well as the concepts and applications of differential and integral calculus via the use of analytic methods and technology. It prepares students for the AB Advanced Placement Examination as well as more advanced mathematical study at the college level. The use of technology is an integral part of this course as are advanced problem solving strategies and methods.

1165 A.P. CALCULUS BC*

5 – 5

Prerequisite: A grade of “B-” or better in Pre-Calculus H

This is a college-level course, which is considerably more extensive and rigorous than the Calculus AB course. It prepares the student to take the BC Advanced Placement Examination as well as more advanced mathematical and scientific study at the college level. All the topics of the Calculus AB course are included, along with additional topics such as differential equations and sequences and series. The use of technology is an integral part of this course as are advanced problem solving strategies and methods.

1166 A.P. STATISTICS*

5 – 5

Prerequisite: A grade of “B-” or better in Pre-Calculus H, or a final grade of “A-” in Pre-Calculus

This course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics. The purpose of the course is to introduce the students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: exploring data, planning a study, anticipating patterns, and statistical inference. Exploration and investigation is fostered via the use of technology tools and applications.

Supplementary Math Courses:

These courses are taken in addition to the appropriate level math course and are required for those students who do not score at the proficient level on state standardized tests.

1157 ALGEBRA II LAB (Full Year)

5 – 5

Prerequisite: Placement by Mathematics Department Chairperson

This course is intended for students who require additional support in mathematics and is taken in conjunction with Algebra II (1160). Students whose NJASK scores were in the partially proficient ranges or who earned a D in Algebra I and/or Geometry w/Trig are strongly encouraged to participate in this course. In addition to supporting the student’s Algebra II experience, this course will also address problem solving and test taking strategies that are consistent with the expectations of state standardized tests.

1190 SENIOR MATH LAB (Fall/Spring Semester)

5 – 2.5

The senior math lab program is structured for individualized teaching/learning and focuses on individual student difficulties. Any student falling below the minimum level of proficiency on the HSPA test must enroll in this course in order to participate in the AHSA (Alternate High School Assessment) process.

*This course meets the NCAA core course requirements - see Section II, p. 17 for explanation.