St. Bernard's High School

Mathematics Department

978.342.3212

Arthur O'Leary
Raul Laborde

45 Harvard Street, Fitchburg, MA 01420

4 Year Mathematics Progression by Level

Level	Level 2 *Average*	Level 1 *Accelerated*	Honors
Freshmen	Algebra 1	Algebra 1	Advanced Algebra II
Sophomore	Geometry	Geometry	Geometry & Trigonometry
Junior	Algebra II	Algebra II & Trigonometry	Pre-Calculus
Senior	1 Semester of Trigonometry 1 Semester of Prob. & Stats	Pre-Calculus	AP Calculus

Mathematics

The mathematics program is intended to provide students with the skills and concepts necessary to meet present needs and requirements demanded by business and post-secondary education. The student will participate in mathematical activities designed to develop basic skills in the operation of numbers and an understanding of concepts that will enable students to be successful in problem solving activities and further study. Our mathematics courses will provide a constant review of material previously covered as well as introducing new topics. Students are expected to choose courses, which challenge their abilities.

Requirements for Graduation: 3 Years of Math

Freshmen Year

Advanced Algebra II, *Honors Level*

This course is designated for the high ability student in both mathematics and English who can comprehend and retain material at an accelerated pace. It begins with a brief review of the basic axioms and properties. It moves quickly to topics the students have not seen before, at least in the method of presentation. The purpose is two fold. First, students should not feel as if most of the course is spent reviewing elementary algebra. Second, the presentation emphasizes the role of algebra as the foundation for advanced courses, especially calculus, rather than a completion of basic algebra. Applications are handled by creating mathematical models of phenomena in the real world. Students must select a kind of function that fits a given situation and derive an equation that suits the information in the problem. The students will understand mathematical ideas such as quadratic equations and graphs, inequalities, determinants, matrices, logarithms, rational, irrational, and complex systems of equations, and exponential equations. The use of graphing calculators is also introduced during this first year.

Prerequisite:
Placement test score of 94 or above in english and mathematics and strong knowledge of basic algebra.
Full year / 1 Credit

Algebra 1, *Level 1*

This course is designated for the superior ability student. Included in the subject matter at this level are the topics of: set theory, equalities, inequalities both linear and quadratic, special products, factoring, quadratic equations, linear systems with two variables, graphs, use of graphics calculator and applied problems in the above topics.

Prerequisite:
Placement test scores of 84 to 93 in mathematics.
Full year / 1 Credit

Algebra 1, *Level 2*

This course introduces the students to the fundamental principles of the real number system. Some topics to be covered: sets, equalities, inequalities, special products, factoring, quadratic equations, simultaneous equations for linear systems and applied word problems.

Prerequisite:
Placement test scores of 70 to 83 in mathematics.
Full year / 1 Credit

Sophomore Year

Geometry & Trigonometry, *Honors Level*

This course covers the material of Euclidian geometry, analytic geometry, and trigonometry. The student learns to reason logically from theorem proofs to applied exercises and word problems. This course in plane and analytic geometry is extended to cover circular trigonometric functions, graphs, and applied word problems in trigonometry. The use of a graphing calculator is required.

Prerequisite:
At least an 84 average in Advanced Algebra 2.
Full year / 1 Credit

Geometry, *Level 1*

This course covers formal proofs of theorems relative to perpendicular and parallel lines, triangles, circles, and other polygons with applied exercises in congruency, similarity, areas, volumes, and word problems.

Prerequisite:
Department recommendation.
Full year / 1 Credit

Geometry, *Level 2*

This course introduces formal proofs but emphasis is placed on geometric concepts through applications in lines. Other topics include congruency and similarity of triangles and polygons, properties of circles and circumferences and areas of circles and polygons.

Prerequisite:
Department recommendation.
Full year / 1 Credit

Geometry, *Level 3*
This course lays the foundation of geometric skills and prepares students to apply them to other areas of mathematics or related disciplines. Topics covered include planes, lines, triangles, circles, and other polygons.

Prerequisite:
Department recommendation.
Full year / 1 Credit

Junior Year

Pre-Calculus, *Honors Level*
This course is offered for the high ability student who has successfully completed the four preparatory college math courses and needs a background in Calculus. It is a pre-calculus course, which leads the student to discover mathematical concepts and relationships by using intuitive, inductive, deductive reasoning and analogy. The major emphasis is placed on higher order functions and graphs, factor theorem, complex numbers, exponential and logarithmic functions, applied trigonometry, analytic trigonometry, DeMoivre's theorem and nth roots, parametric equations and polar coordinates as well as matrices on systems of equations and inequalities. The use of a graphing calculator is required.

Prerequisite:
At least an 84 average in Advanced Algebra II and Geometry/Trigonometry.
Full year / 1 Credit

Algebra II & Trigonometry, *Level 1*
This course gives an axiomatic approach to sets of numbers, products and factoring of polynomials, and a graphical and analytical treatment of equalities and inequalities in one and two variables. Other topics included are real numbers, logarithmic relations and functions as well as applied word problems. The course is extended to include circular trigonometric functions, identities, formulas, graphs and applied word problems in trigonometry.

Prerequisite:
At least an 84 average in Algebra I (Level 1) and Geometry (Level 1).
Full year / 1 Credit

Algebra II, *Level 2*

This course reviews Algebra I and then deals with the following topics: products and factoring of polynomials, rational and irrational algebraic operations, linear, quadratic, exponential and logarithmic relations as well as applied word problems.

Prerequisite:
At least a 70 average in Algebra I.
Full year / 1 Credit

Senior Year

Advanced Placement AB Calculus, *Honors Level*
*Students must take the AP Calculus AB examination
This is a college level course including analytical geometry, limits, derivatives, integration, transcendental functions, methods of integrations and applied word problems. The course includes derivations of formula and theorems, theorem proofs, exercises and applied engineering problems.

Prerequisite:
At least an 84 average in Advanced Algebra II, Geometry/Trigonometry, and Pre-Calculus.
Full year / 1 Credit

Pre-Calculus, *Level 1*

High ability students who have successfully completed all preparatory college math courses are introduced to mathematical concepts and relationships by using analysis and synthesis to solve exercises as well as real world problems. The course covers advanced trigonometry as well as pre-calculus concepts. The major emphasis is placed on a complete overview of all math concepts and skills in preparation for college. The use of a graphing calculator is required.

Prerequisite:
At least an 84 average in Algebra I, Geometry, and Algebra II/Trigonometry (Level 1).
Full year / 1 Credit

Trigonometry/ Probability & Statistics, *Level 2*

This course covers trigonometric functions, identities, acute angles, right triangles, radian measure, and the graphs of all circular functions. All concepts are connected to real word problem situations. During the second semester, students are introduced to the basic concepts and goals of probability and statistics including frequency distributions, permutations, combinations, binomial and normal distributions, measures of position, central tendency, and variation.

Prerequisite:
At least a 70 average in Algebra I, Geometry, and Algebra II.
Full Year / 1 Credit