Mathematics

Grade 9	Grade 10	Grade 11	Grade 12
			AP Calculus (AP)
			AP Statistics (AP)
Algebra II (H)	Geometry (H)	Precalculus (H)	
Algebra I (CP4)	Geometry (CP4)	Algebra II (CP4)	Precalculus (CP4)
		Discrete Mathematics (CP4)	Algebra II (CP4)
			Intro to Trig. & Intro to Stats. (CP4)
Algebra IA (CP2)	Algebra IB (CP2)	Geometry (CP2)	Modeling in Algebra IIB (CP2)
		Algebra IIA (CP2)	Modeling in Financial Literacy (CP2)

Chart is organized by level.

GRADE 9 MATHEMATICS COURSE OFFERINGS
Course descriptions are organized by course/level

Algebra II (H) (2 periods/full year)   1.0 credit
Prerequisites: **"A" or "B" for Algebra I in middle school and placement testing**

This grade 9 honors course is for students who have achieved a grade of B or higher in a full year Algebra I course in their middle school. It focuses on skills for such topics as solving and graphing: systems of equations, systems of linear equalities, quadratic equations, absolute value equations, polynomial functions, radical equations, and exponential equations. This course will also cover factoring techniques, matrices, complex numbers, rational and negative exponents, logarithms, rational expressions and equations, arithmetic and geometric series and sequences, and working with trigonometric functions. This is an honors level course which progresses at an accelerated pace.

Algebra I (CP4) (2 periods/full year)   1.0 credit
Prerequisite: **Grade 9 placement testing**

This is a college-preparatory course involving operations with real numbers. The topics include solving equations and inequalities, factoring trinomials and simplifying fractional expressions with variables. Students will find the equations of lines, parallel and perpendicular lines, solve and graph systems of linear equations and inequalities, quadratic equations, absolute value equations and inequalities. Students will also work with exponents and exponential functions, polynomials, and data analysis.

Algebra IA (CP2) (2 periods/full year)   1.0 credit

Algebra IA (CP2) is the first part of a two year Algebra I (CP2) course. The course includes solving and graphing; linear equations, inequalities and absolute value, solving systems of linear equations, exponents and exponential functions. It also involves solving word problems within each of the topic areas.

GRADE 10 MATHEMATICS COURSE OFFERINGS

Geometry (H) (2 periods/full year)   1.0 credit
Prerequisite: **Algebra II (H)**
Recommendation: 80% or higher in prerequisites

This grade 10 honors level course is for students who have achieved at least an 80% average in Honors Algebra 2 or with a recommendation from the Honors Algebra 2 instructor. This course addresses Geometry from an Algebra 2 emphasis with a strong concentration on geometric proofs and geometric constructions. The course will cover

definitions, congruency, similarity, transformations, right triangle relationships, trigonometric ratios, probability, and statistics. Students will determine the attributes of polygons, circles, special quadrilaterals, similar figures, as well as determine cross-sections of geometric figures. Students will do constructions to determine midpoints, angle bisectors, congruency, and points of concurrency. This is an honors level course which progresses at an accelerated pace.

Geometry (CP4) (2 periods/full year)   1.0 credit
Prerequisite: **Algebra I (CP4)**

This sophomore level course is designed to explore in detail topics such as definitions, reasoning and proof, triangles, parallels and perpendiculars, polygons, quadrilaterals, ratio and proportion, similar figures, transformations, right triangle relationships, trigonometric ratios, area, volume and facts about circles. Students will also learn how to do geometric constructions.

Algebra IB (CP2) (2 periods/full year)   1.0 credit
 Prerequisite: **Algebra IA (CP2)**

This course consists of a brief review of operations with real numbers, linear equations and inequalities, and word problems. It will also cover topics, which include factoring and operations with polynomials, solving and graphing quadratic equations, and data analysis.

GRADE 11 MATHEMATICS COURSE OFFERINGS

Precalculus (H) (2 periods/full year)   1.0 credit
Prerequisite: **Geometry (H)**

This junior level honors course begins by discussing advanced topics in algebra. Topics covered include functions and their graphs, finding real and complex roots of functions, and properties of polynomial, rational, radical, exponential, and logarithmic functions. The second part of this course focuses on trigonometry. During this part of the course, trigonometric functions will be analyzed from both an algebraic and graphical perspective. Additional trigonometric concepts include solving triangles, working with trigonometric identities, and applications of trigonometry involving complex numbers. The course concludes with a study of parametric equations and polar coordinates, using matrices to solve systems of equations, properties of sequences and series, and mathematical induction. If time allows, a brief overview of combinatorics and probability will be included. Students will be expected to derive many of the formulas introduced throughout the course. Additionally, graphing calculators will be used to analyze functions and it is highly recommended that students obtain their own graphing calculator. Recommended graphing calculators include the TI-83+, TI-84+, or TI-84+ CE.

Discrete Mathematics (CP4) (2 periods/full year)   1.0 credit
Prerequisites: **Algebra 1(CP4) and Geometry (CP4)**

This is a course for junior CP4 students and focuses on graph theory, which is the study of vertex-edge graphs. Topics covered include: Number and Set theory, Counting Methods. Probability, Logic, Isomorphism, Coloring, Planarity, Trees, Digraphs, Tournaments, Circuits, Vectors, Matrices, and Sequences.

Algebra II (CP4) (2 periods/full year)   1.0 credit
Prerequisite: **"70" or above in Algebra I (CP4)**

This junior college-prep course focuses on skills for such topics as solving and graphing: quadratic equations, polynomial functions, absolute value equations, radical equations, and exponential equations. This course will also cover factoring techniques, complex numbers, rational and negative exponents, logarithms, composition of functions, inverse functions, rational expressions and equations, arithmetic and geometric series and sequences, and working with trigonometric functions.

Algebra IIA (CP2) (2 periods/full year)   1.0 credit
Prerequisite: **Algebra I (CP4)**

This junior level course focuses on skills for such topics as solving quadratic equations, polynomial functions, absolute value equations, and radical equations. Graphing techniques as well as similar features of graphs will be examined. This course will also cover multiple types of factoring techniques, complex numbers, and rational and negative exponents. It will also cover exponential growth and decay.

Geometry (CP2) (2 periods/full year)   1.0 credit
Prerequisites: **Algebra IA (CP2) and IB (CP2)**

In this junior level course, students will explore in detail topics such as basic definitions, proofs, triangles, parallels and perpendiculars, polygons, quadrilaterals, ratio and proportion, similar figures, transformations, right triangle relationships, area, and volume.

GRADE 12 MATHEMATICS COURSE OFFERINGS

NEW

AP Calculus (AP) (2 Periods/Full Year)   1.0 Credit
Prerequisite: Precalculus (H)

This AP Course will cover the material applicable to the AP Calculus AB exam. Course topics include limits, derivative techniques, higher order derivative properties and applications, transcendental function calculus, basic and intermediate analytic integration, numerical differentiation, numerical integration, and area/volume/cross section integrals. Time will also be dedicated to ensuring that students are able to use technology as a complement to their calculus skills. Throughout this course, students will have the opportunity to apply these concepts and skills to real-world problems. Students are encouraged to take the AB Calculus exam. A score of 3-5 on this exam will be sufficient for credit at most colleges and universities.

AP Statistics (AP) (2 periods/full year)   1.0 credit
Prerequisite**: Algebra II**

This course is designed to follow the Advanced Placement (AP) Statistics course guidelines as set forth by the College Board for AP Statistics. AP Statistics is the study of data analysis, experimental design, and probability as it relates to statistical inference, and the practice of data gathering and evaluation of statistical inference in an elementary statistics setting. This course is activity-based with a variety of activities, labs, and projects. Students will be able to communicate effectively the statistical concepts taught throughout this course. Applications will be drawn from other disciplines that include but are not limited to psychology, sociology, health fields, engineering, business, and liberal arts. It also incorporates the routine use of TI-84 graphing calculators as well as computers. Students will be required to take and pay for the AP exam at the end of the year. Students passing the AP exam with a score of 3-5 receive college credit at most universities.

Precalculus (CP4) (2 periods/full year)   1.0 credit
Prerequisites**: Algebra II (CP4 or H) and Geometry (CP4 or H)**
Recommendation: **80% average in prerequisites**

This senior level CP4 course begins by discussing advanced topics in algebra. Topics covered include functions and their graphs, finding real and complex roots of functions, and properties of polynomial, rational, radical, exponential, and logarithmic functions. The second part of this course focuses on trigonometry. During this part of the course, trigonometric functions will be analyzed from both an algebraic and graphical perspective. Additional trigonometric concepts include solving triangles, working with trigonometric identities, and applications of trigonometry involving complex numbers. The course concludes with a study of parametric equations, polar coordinates, and using matrices to solve systems of equations. If time allows, a brief overview of sequences and series will be included. Additionally, graphing calculators will be used to analyze functions and it is highly

recommended that students obtain their own graphing calculator. Recommended graphing calculators include the TI-83+, TI-84+, or TI-84+ CE.

Algebra II (CP4) (2 periods/full year)   1.0 credit

This grade 12 college-prep course consists of a brief review of Algebra I (CP4) skills. It focuses on increased knowledge of solving linear and quadratic equations and inequalities, as well as systems of equations. It also covers all word problems, factoring of trinomials and application of geometry skills.

Introduction to Trigonometry (CP4) (2 periods/half year)   .50 credit
Prerequisites**: Algebra I (CP4), Geometry (CP4 or H), Algebra II (CP4 or H)**
This course must be taken with Introduction to Statistics to satisfy the full-year math requirement.

Introduction to Trigonometry is a college and career preparatory course for grade 12 students, emphasizing degrees, radians, unit circle trigonometry, trigonometric functions and their graphs, inverse trigonometry and solving right triangles. Additionally, we will cover law of sines and cosines, vectors, and polar coordinates. If time permits additional topics will include trigonometric identities, Heron's formula, and logarithms.

Introduction to Statistics (CP4) (2 periods/half year)   .50 credit
Prerequisites**: Algebra I (CP4), Geometry (CP4 or H), Algebra II (CP4 or H)**
This course must be taken with Introduction to Trigonometry to satisfy the full-year math requirement.

This college-prep course for grade 12 students requires that students collect, organize, summarize and analyze data using numeric and graphic techniques to gain insights into trends and make predictions of behavior. Students will study measures of central tendency and compute standard deviation. They will use math modeling to test their hypotheses. Students will also learn the basic rules of probability, and the properties of probability distribution. Students will investigate, design, and conduct experiments and complete projects independently and in small groups.

Modeling in Financial Literacy (CP2) (2 periods/full year)   1.0 credit
Prerequisite: **Algebra I (or Algebra IA and IB); Geometry; Qualifying score on Placement Test**

Students in this course will develop college and career readiness skills, starting with a comprehensive review of basic mathematics skills and study of algebra and culminating in the study of math modeling. Students will learn to think critically and model real world mathematical problems that include number and quantity, algebra, geometry, functions, and statistics and probability. The secondary focus will be on learning important personal financial management skills such as maintaining a personal checking and savings account; proper use of credit; buying/financing a vehicle; and becoming knowledgeable about various types of insurance (home, health, life, disability, etc.). *After successful completion of this course (70 or better), students will be eligible for 4 institutional credits through Mount Wachusett Community College:* MAT092 Basic Math Skills.

Modeling in Algebra IIB (CP2) (2 periods/full year)   1.0 credit
Prerequisite: **Algebra I (or Algebra IA and IB); Geometry; Qualifying score on Placement Test**

Students in this course will develop college and career readiness skills, starting with a comprehensive review of basic mathematics skills and continuing with the study of algebra and culminating in the study of math modeling. Students will learn to think critically and model real world mathematical problems that include number and quantity, algebra, geometry, functions, and statistics and probability. This course is designed to prepare students for the credit-bearing courses of College Algebra, Topics in Math, Statistics, or Elements of Math. Topics include: graphing equations and inequalities, exponents and polynomials; factoring polynomials; solving quadratic equations by factoring; rational expressions; roots and radicals. *After successful completion of this course (70 or better), students will be eligible for 4 institutional credits through Mount Wachusett Community College:* MAT092 Basic Math Skills.