



Math Department Course Offerings

Pre-AP Algebra I Course #: 4411 Grade: 9 Prereq: None Credit: 1 Core Math Weight: Honors (.5)	Students completing this course will have covered the following major concepts: solid geometry: number sense – algebraic operations with problem-solving; solving equations – one variable 1st degree; inequalities – one variable 1st degree; functions and relations; statistics and probability: linear equations/inequalities: systems of equations with problem-solving; polynomials; rational expressions, and radicals – square roots include variables.
Pre-AP Geometry Course #: 4520 Grade: 9-10 Prereq: 4411 Credit: 1 Core Math Weight: Honors (.5)	Students completing this course will have covered the following major concepts: patterns, lines, and planes; classifying triangles, parallelograms, and other polygons; reasoning in geometry; coordinates in geometry; parallel lines; angle relationships; conjectures about triangles; areas and volumes; applying right triangles; and circles and spheres.
Pre-AP Algebra II Course #: 24412 Grade: 9-11 Prereq: 4520 Credit: 1 Core Math Weight: Honors (.5)	Pre-AP Algebra II contains similar topics as Algebra I but with more depth, breadth, and sophistication. We cover the main families of functions (lines, polynomials, roots, exponentials, logarithms, and rational functions) and use them to model real-world data. Additional topics include complex and irrational numbers, sequences and series, statistical methods, and trigonometry. Emphasis is placed on the connection between visual and algebraic representations of data.
AP PreCalculus Course #: 4614 Grade: 10-12 Prerequisites: 24412 Credit: 1 Core Math Weight: AP (1)	Pre-Calculus emphasizes applied techniques and critical thinking. The first half covers functions, polynomials, powers, limits, exponentials, logarithms, and basic Trigonometry. The second half covers advanced Trigonometry, vectors, conic sections, probability, and an introduction to the Calculus concepts of limits, derivatives, and integrals.
AP Calculus AB Course #: 4615 Grade: 11-12 Prerequisites: 4614 Credit: 1 Core Math Weight: AP (1)	Through the use of big ideas of calculus (e.g., modeling change, approximation and limits, and analysis of functions), each course becomes a cohesive whole, rather than a collection of unrelated topics. Both courses require students to use definitions and theorems to build arguments and justify conclusions. The courses feature a multi-representational approach to calculus, with concepts, results, and problems expressed graphically, numerically, analytically, and verbally. Exploring connections among these representations builds an understanding of how calculus applies limits to develop important ideas, definitions, formulas, and theorems. A sustained emphasis on clear communication of methods, reasoning, justifications, and conclusions is essential. Teachers and students should regularly use technology to reinforce relationships among functions, to confirm written work, implement experimentation, and assist in interpreting results. AP Calculus AB is designed to be the equivalent of a first-semester college calculus course devoted to topics in differential and integral calculus.

**AP Calculus BC****Course #: 4616**

Grade: 11-12

Prerequisites: 4615

Credit: 1 Core Math

Weight: AP (1)

AP Calculus BC applies the content and skills learned in AP Calculus AB to parametrically defined curves, polar curves, and vector-valued functions; develops additional integration techniques and applications; and introduces the topics of sequences and series.

AP Statistics**Course #: 4760**

Grade: 11-12

Prereq: 4614

Credit: Any Math

Weight: AP (1)

AP Statistics introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. There are four themes evident in the content, skills, and assessment in the AP Statistics course: exploring data, sampling and experimentation, probability and simulation, and statistical inference. Students use technology, investigations, problem-solving, and writing as they build conceptual understanding. The AP Statistics course is equivalent to a one-semester, introductory, non-calculus-based college course in statistics.

PLTW Engineering Essentials**Course #: 5010**

Grade: 9-12

Prerequisites:

None

Credit: 1 Elective
Math

Weight: None (0)

In PLTW Engineering Essentials, students explore the work of engineers and their role in the design and development of solutions to real-world problems. The course introduces students to engineering concepts that are applicable across multiple engineering disciplines and empowers them to build technical skills through the use of a variety of engineering tools, such as geographic information systems (GIS), 3-D solid modeling software, and prototyping equipment. Students learn and apply the engineering design process to develop mechanical, electronic, process, and logistical solutions to relevant problems across a variety of industry sectors, including health care, public service, and product development and manufacturing. Using PLTW's activity-, project-, problem-based (APB) instructional approach, students advance from completing structured activities to solving open-ended projects and problems that provide opportunities to develop planning and technical documentation skills, as well as in-demand, transportable skills, such as problem-solving, critical and creative thinking, collaboration, communication, and ethical reasoning. The last is particularly important as the course encourages students to consider the impacts of engineering decisions. Through both individual and collaborative team activities, projects, and problems, students create solutions to problems as they practice common engineering design and development protocols, such as experimental design, testing, project management, and peer review. In addition, the course emphasizes statistical analysis and mathematical modeling – computational methods that are commonly used in engineering problem-solving.

PLTW Engineering Design**Course #: 5070**

Grade: 10-12

Prereq: 5010

Credit: 1 Elective
Math

Weight: None (0)

In PLTW Engineering Design, students explore engineering tools and apply a common approach to the solution of engineering problems, an engineering design process. Utilizing the activity-project-problem-based (APB) teaching and learning pedagogy, students progress from completing structured activities to solving open-ended projects and problems that require them to plan, document, communicate, and develop other professional skills. Through both individual and collaborative team activities, projects, and problems, students apply systems thinking and consider various aspects of engineering design including material selection, human-centered design, manufacturability, assemblability, and sustainability. Students develop skills in technical representation and documentation especially through 3D computer modeling using a Computer Aided Design (CAD) application. As part of the design process, students produce precise 3D-printed engineering prototypes using an additive manufacturing process. Student-developed



testing protocols drive decision-making and iterative design improvements. To inform design and problem solutions addressed in IED, students apply computational methods to inform design by developing algorithms, performing statistical analyses, and developing mathematical models. Students build competency in professional engineering practices including project management, peer review, and environmental impact analysis as part of a collaborative design team. Ethical issues related to professional practice and product development are also presented.