

COURSE DESCRIPTIONS

MATH, SCIENCE, TECHNOLOGY COURSES

(Classes for major students and elective courses for students from other magnets)

MST *Advanced Program* Geometry/Algebra II (42730391)

Grade level: 9th

Prerequisite: Admission to MST, Placement test

This course is an enriched Algebra II curriculum with an in-depth study of equations and functions. It is designed for students who have completed Grade 8 Algebra I and Advanced Geometry. In addition, this course includes the study of step functions, natural logarithms, determinants, and conic sections. This course is taught in a more mathematically rigorous manner and at an accelerated pace.

MST *Advanced Program* Algebra II/Trigonometry (42720391)

Grade level: 10th

Prerequisite: Successful completion of MST Geometry/Algebra II

This course provides students with opportunities to make conjectures about geometric situations and prove in both formal and informal ways to form a logical conclusion of their hypothesis. This course is meant to employ integrating synthetic, transformational and coordinate approaches, justify relationships and properties and investigate geometric situations. Heavy emphasis is placed on advanced algebra, the theory of functions, trigonometry and statistics.

MST *Advanced Program* Pre-Calculus/Calculus (42740391)

Grade level: 11th

Prerequisite(s): MST Geometry/Algebra II and MST Algebra II/Trigonometry

This course explores topics such as advanced theory of functions with an emphasis on graphing techniques, algebraic theory, advanced geometry and trigonometry, limits and an introduction to differential calculus.

***Advanced Placement* Calculus B/C (42750461)**

Grade level: 12th

Prerequisite(s): MST Algebra II, MST Geometry/Trigonometry, and MST Pre-Calculus/Calculus

This course follows the College Board curriculum. The course includes all of the topics covered in AP Calculus AB, as well as convergence tests for series, Taylor and/or Maclaurin series, the use of parametric equations, polar functions, including arc length in polar coordinates, calculating curve length in parametric and function equations, L'Hôpital's rule, integration by parts, improper integrals, Euler's method, differential equations for logistic growth, and using partial fractions to integrate rational functions.

Note: College level curriculum taught in a high school setting

MST *Advanced Program* Integrated Science (44010991)

Grade level: 9th

Prerequisite(s): Admission to MST

This course is an inquiry based interdisciplinary course that emphasizes topics in conceptual physical and earth science within a laboratory setting. In addition, each student is given the opportunity to learn from in depth laboratory exercises and special projects. Note: Intensive research is emphasized in this course.

MST *Advanced Program* Chemistry (44230991)

Grade level: 10th

Prerequisite(s): MST Geometry/Trigonometry

This course explores topics such as equations, equilibrium (theory and quantitative treatment) kinetics, thermodynamic relations, organic chemistry, chemical calculations, and descriptive chemistry.

MST *Advanced Program* Biology (44120991)

Grade level: 11th

Prerequisite(s): Admission to MST

This course is a college-level course. Topics include cellular structure and function, photosynthesis, genetics, classification, metabolic physiology, ecology, and ethology.

MST Advanced Program Physics (44340991)**Grade level: 10th-12th****Prerequisite(s): MST Algebra II**

This course is a college-prep physics course designed for the student who has completed algebra and has had an introduction to the definitions of sine, cosine and tangent. It provides a detailed introduction to the methods and concepts of general physics. Heavily emphasizing vector analysis, this text is ideal preparation for a university-level physics course. It provides the student with a strong background in one-dimensional and two-dimensional motion, Newton's laws and their application, gravity, work and energy, momentum, periodic motion, waves, optics, electrostatics, electrodynamics, electrical circuits and magnetism.

Advanced Placement Physics B (44350361)**Grade level: 12th****Prerequisite(s): MST Pre-Calculus/Calculus**

This course provides detailed descriptions of kinematics, dynamics, rotational motion, gravity, oscillations, waves, optics, thermal physics, electrical forces, electrical potential, DC circuits, magnetic forces, atomic physics and nuclear physics. The student is also given an introduction to the fascinating topics of special relativity and general relativity.

Note: College level curriculum taught in a high school setting

Advanced Placement Biology II (44130461)**Grade level: 11th-12th****Prerequisite(s): Successful completion of Biology 1**

This course follows the College Board curriculum and covers topics regularly covered in a college biology course for majors.

Note: College level curriculum taught in a high school setting

Advanced Placement Environmental Science (44030061)**Grade level: 11th-12th****Prerequisite(s): Integrated Science (or Chemistry), Biology**

This is a course in which high school students have the opportunity to earn college credit while they are still in high school. This course follows the College Board curriculum and is designed to provide students with the scientific principles, concepts, and methodologies required to understand the cycles in nature, interrelationships of the natural world, and to identify and analyze environmental problems.

Note: College level curriculum taught in a high school setting

Advanced Placement Chemistry II (44240161)**Grade level: 11th or 12th****Prerequisite(s): Successful completion of Chemistry 1**

This course follows the College Board curriculum and covers material that would normally be covered in a college introductory chemistry course.

Note: College level curriculum taught in a high school setting

Science Independent Research (44531211)**Grade level: 11th or 12th****Prerequisite(s): Instructor approval**

This course involves students in both qualitative and quantitative research. The course provides interested students an opportunity for studies within the sciences field. Student researchers utilize the Internet, keep detailed journals and meet individually with Instructors.

Special Topics in Science: Bioethics (43640121)**Grade level: 11th or 12th****Prerequisite(s): Chemistry I and Biology I**

This course introduces foundational concepts of moral and ethical theory and will present a survey of core issues and cases that have defined the field of bioethics. You will be expected to meet three key objectives:

1. Understand, articulate, and counter different types of ethical arguments, theories, and approaches.
2. Describe the theoretical, historical, and contextual underpinnings of current debates and cases in bioethics.
3. Reflect upon, challenge, defend and refine ethical positions through structured discourse, respectful debate, and scholarly research and writing.

Note: This is an upper level elective course, which will require a commensurate amount of reading, writing, and class participation. You should anticipate spending a substantial amount of time reading and preparing for the next day's class meeting.

Advanced Computer Applications (MST students only) (45025941)**Grade level: 9th****Prerequisite(s): This course is required for all MST students!**

This course is a computer literacy course designed for students who have been accepted into the MST magnet at duPont Manual High School. Students will acquire a detailed knowledge of computer operating systems, word processing, spreadsheet applications, presentations, database usage, Internet, research, and Web Site design using Windows. As time and availability allow, students will be exposed to other aspects of computer usage such as desktop publishing, telecommunications, and video capture.

Introduction to Computer Programming (45639911)**Grade level: 10th****Prerequisite(s): Computer applications, Algebra I**

This course covers the concepts basic to computer science: data representation and encapsulation, substitution, composition of functions, iteration, recursion, and algorithmic analysis. Students begin with no knowledge of programming and learn to write programs using a modern, high-level programming language. Emphasis is placed on the development of problem solving skills.

Advanced Placement Computer Science (45640761)**Grade level: 11th or 12th****Prerequisite(s): Computer applications, Intro to Computer Programming**

This course follows the College Board AP Computer Science curriculum and covers the basic concepts common to the first-year sequence in most college computer science majors. The course focuses on concepts of object-oriented programming, including inheritance and modularization. In addition, students learn about common data structures, including heaps, stacks, queues, linked lists, binary search trees, and hash maps.

Note: College level curriculum taught in a high school setting

Web Design (45631241)**Grade level: 10th-12th****Prerequisite(s): Instructor Approval**

This course is designed for students who want to learn how to plan and create well-designed Web pages that combine effective navigation with the use of graphics, text, and colors. In this course students will gain a critical eye for evaluating Web pages by looking at examples of pages and applying the design principles to their own work. All Web pages will be created using HTML with a plain text editor. Students learn how to create a Web page using HTML, format the page, add graphics to the page, and create forms with this highly visual, step-by-step introduction to HTML. Students learn how to design and create a Web page by formatting and adding graphics to a page, creating forms, tables and frames, and more.

This includes coverage of JavaScript, design tactics, cascading style sheets, and XML. Real-world case scenario incorporates activities students will encounter when using HTML, making problem solving more meaningful. Students will also become familiar with photo editing, scanning, and digital photography and use these tools to deliver their Web content in an interesting and visually exciting way.

Special Topics in Computer Science (45641341)

Grade level: 11th-12th

Prerequisite(s): AP Computer Science (May be taken concurrently), Instructor Approval

Special Topics in Computer Science covers topics in programming, user interface design, and operating systems beyond those covered in the Introduction to Computer Programming and AP Computer Science courses. Students choose projects to complete that involve research, self-study, and team development, with emphasis on developing projects for particular users that are applicable in the real world.