MA^{2}S COURSE DESCRIPTIONS

GRADE 9

HONORS SURVEY SCIENCE (1st semester)

Survey Science is a class that introduces freshmen to the skills used at MA^{2}S and across science, technology, engineering and mathematics (STEM) fields, including: collaboration, cooperation, writing and graphical representation, listening, presentation, experimentation and inquiry, measuring and conversion, estimation and derivation, and editing skills. In developing these skills students will critically analyze and/or put to practice the MA^{2}S expectations and Costa and Kallick's Habits of Mind (as compiled based on feedback from business and industry leaders). Students will design their own investigations, learn about common scientific terminology, and learn how to communicate in the third-person-past-passive-tense style of scientific writing. As time allows, students will learn about matter and energy, including the conservation thereof, and the structure and classification of matter.

HONORS PHYSICAL SCIENCE (2nd semester)

Physical Science is an introduction to the basic laws of physics leading ultimately to the structure of the atom and quantum mechanics. The class will begin with an in-depth physical, graphical, and mathematical exploration of one-dimensional motion. This will be followed by a discussion of projectiles and Newton's Laws of Motion, providing the background for a basic study of the forms of energy and its conservation. The learned physics will be used to examine the structure of an atom, quantum mechanics, and nuclear chemistry. If time permits, the class will conclude by exploring sound and light.

HONORS GEOMETRY/INTRODUCTORY TRIGONOMETRY

This course includes the study of shape and size as well as an in-depth approach to logic and proof writing. Geometry is also explored with many of the concepts taught in a hands-on approach. Discovery is used as students learn and master the "art" of geometric construction with a compass and straightedge.

Exploration of the concept of similarity leads into trigonometry. Right angle trigonometry as well as advanced trigonometric functions is studied. Similarity is used to look at more advanced concepts of size, area and volume.

STATISTICAL DESIGN OF EXPERIMENTS (D.O.E.)

This course emphasizes the proper design of quantitative experiments. Students will practice statistical techniques that will be integrated into experiments and lessons to be performed in the science and math classrooms. The students will learn the power of visual representation of data as a necessary precursor to more advanced high school and/or college courses.

GRADE 10

HONORS CHEMISTRY

This is a first year inorganic chemistry class. Students will explore such topics as atomic theories, stoichoimetry, gas laws, solutions, and acid/bases. Lab work and team research will be used weekly to gain a better understanding of these topics.

HONORS ADVANCED ALGEBRA/TRIGONOMETRY

This course involves the study of the concept of a function and use in everyday life as well as value in modeling situations deemed valuable in scientific research. Graphing of functions is used throughout with advanced technology such as the TI-83 Plus calculator as well as computer graphing programs such as EXCEL. Matrices, polynomials, quadratic functions, inverses and radicals, exponential and logarithmic functions are also included. Further study is done in trigonometry with emphasis on modeling and graphing of trigonometric functions.

COMPUTER SCIENCE

The 10^{th} grade Computer Science course is a year long project based course that provides students with a solid introduction into computer programming, videography, and/or robotics. Students use the Blitz Basic programming environment to design and implement self-designed video games. As students move into the 2^{nd} semester they are given a choice between Videography and Robotics. Both courses are state of the art courses using emerging techniques and information from the ever changing realm of technology.

GRADE 11

HONORS BIOLOGY

Students use discovery, problem solving, manipulation, creativity, and microscopy to investigate heredity, cells, evolution, energy systems, and interaction of organisms with each other and their environments. They will regularly synthesize these topics together, to understand that each is an important part of the composite of biology.

HONORS PRECALCULUS/DISCRETE MATHEMATICS

This course will focus on integrating the major ideas of mathematics needed for calculus. Concepts such as elementary functions – more specifically polynomial, rational and trigonometric functions, polar coordinates and complex numbers will be investigated in depth. The fundamental notions of discrete mathematics (which encompasses such concepts as recursion, mathematical induction, combinatorics, graph, matrices and circuits) will also be included in this yearlong study.

INTERDISCIPLINARY STUDIES/C++ PROGRAMMING

IDS - Students will conduct self-directed learning and research of real world products and problems. Their findings will then be presented in both written and verbal professional formats to the appropriate industry partner or granting institution. First semester will be driven by our Motorola partnership and second semester will focus on our Convergence Education Foundation project about alternative liquid hydrocarbon fuel sources.

OR

C++ - This year long course provides the student with a practical introduction to the C++ programming language. The student will code programs using basic constructions of decision, loops, structures, and simple function inherent to the C++ language. As the student progresses through the course, self-designed projects based on a set of criteria will be a significant expectation of this class.

GRADE 12

HONORS PHYSICS (1st semester)

This is an advanced physics course that will explore the in-depth mathematics of topics such as linear and rotational mechanics, waves (light and sound), and electricity and magnetism. Lab work and team research will be used extensively to investigate real-world applications of these subjects.

HONORS FORENSICS (2nd Semester)

Forensics will utilize analytical and practical science skills learned at MA^2S to solve staged crime scenes. Examples include the physics and morphology of glass fracturing, the biochemistry of blood, applications of electrophoresis, projectile motion, etc. Will you figure out whodunit?

HONORS ADVANCED SCIENCES

Advanced Sciences is an extension of general physics, chemistry, and biology. Physics topics will focus on using higher level math to explore the motion of objects; waves, light, and sound; optics (mirrors and lenses); electricity and magnetism; and astronomy. Chemistry topics will include advanced reactions, advanced thermodynamics, reaction kinetics, electrochemistry, organic chemistry, plastics, and nuclear chemistry. Biology topics will include an exploration of human anatomy and physiology utilizing direct applications, medical models, and problem-based learning. Students will learn the systems and structures of the body and how they function, recalling cellular function and genetics.

HONORS CALCULUS

This full year course encompasses a comprehensive study of analytic geometry, limits, differentiation and integration of functions. Topics will be presented graphically, numerically, and algebraically. The use of calculus to solve problems in modern society will also be explored in this in-depth course.