Mountain Vista Governor's School
Course Descriptions with Coding Number
2010-2011

*Students completing these courses may earn dual enrollment credit, pending the hiring of qualified teaching staff and Lord Fairfax Community College approval.

MVGS Physics 1: Mechanics * 457019

Physics I is a calculus-based, first-year physics course. The primary focus of study will include the topics of Newtonian Mechanics and Thermodynamics. Inquiry-based laboratory investigations include extensive integration of technology. This course is integrated with MVGS Calculus I. Upon successful completion of the course, students will be eligible to take the Advanced Placement Physics C (Mechanics) examination.

MVGS Physics II: Electricity and Magnetism* 457029

Physics II is a calculus-based, second-year physics course. Inquiry is stressed and laboratory investigations incorporate extensive integration of technology. The primary focus of study will include the topics of Electricity and Magnetism and Modern Physics. This course is integrated with MVGS Calculus II. Upon successful completion of the course, students will be eligible to take the Advanced Placement Physics C (Electricity & Magnetism) examination.

MVGS Environmental Science* 427009

This course is the equivalent of a two-semester college introductory environmental science course. It is an interdisciplinary course, tying together the political, social, economic, and ethical aspects of environmental issues with geological, biological, and chemical principles. Major units of study include Earth Systems, Ecosystem Dynamics, Community and Population Ecology, Biological Resources and Biodiversity, Geochemical Resources & Consumption, Pollution, and Global Change. Upon successful completion of the course, students will be eligible to take the AP Environmental Science examination.

1st Year MVGS Calculus* 317719 This is a first year, rigorous course in calculus with analytic geometry. Topics include concepts and applications of differential and integral calculus and an introduction of elementary differential equations. Applications of social, biological, and physical science will be emphasized throughout the course to support mathematical content and applications within all MVGS courses, especially *Physics I: Mechanics*. The use of technology will be emphasized and integrated throughout the course. Upon successful completion, students will be eligible to take the Calculus AB Advanced Placement examination.

2nd Year MVGS Calculus with Topics in Multi-Variable* 317729 The second year course is a continuation of calculus topics from the first year course and an introduction to multivariable calculus. Topics include sequences and series, elementary differential equations, three-dimensional analytical geometry, vector analysis, partial derivatives, optimization, double and triple integrals. Applications of social, biological, and physical science will be emphasized throughout the course to support mathematical content and applications within all MVGS courses, especially *Physics II: Electricity and Magnetism*. The use of technology is integrated throughout the course. Upon successful completion, students will be eligible to take the Calculus BC Advanced Placement examination.

MVGS Linear Algebra with Special Topics* 319909 This course will provide an opportunity to complete a semester course in college-level Linear Algebra. Content will include matrices, vector spaces, determinants, solutions of systems of linear equations, basis and dimension, eigenvalues, and eigenvectors. Second semester, the class will explore topical areas of interest to or needed by the students. Topics may include Number Theory, Discrete Mathematics/Cryptology with Computer Science applications, Multivariate Calculus, Vector Calculus, Calculus-based Statistics and Probability, Abstract Algebra, Analysis, Graph Theory, or Geometry. Applications of social, biological, and physical science will be emphasized throughout the course to support mathematical content and applications within MVGS courses, especially Research II. The use of technology is integrated throughout the course. Prerequisite: MVGS 1st Year Calculus or AP Calculus AB

MVGS Statistics 319209* This course is a study of descriptive and analytical (non-Calculus) Statistics. Students will learn and apply four broad conceptual themes, which include exploring data, planning a study, anticipating patterns in advance, and statistical inference. Students will use statistics as a tool to predict, investigate, and analyze a variety of statistical and research problems. MVGS Statistics will parallel and support elements of Research courses. Extensive use of calculator and computer technologies including a statistics package will be used. A TI-84 or equivalent graphing calculator is required. Upon successful completion, students will be eligible to take the Statistics Advanced Placement examination.

MVGS Humanities I: The Power of Thought / English 11* 119609

Beginning with philosophical systems of thought, this Humanities course will engage students in an exploration of the philosophical and historical foundations of knowledge against the broader background of Western thought as it applies to classical and modern literature, science, and mathematics. The classic philosophical tools such as logic, analysis, rhetoric, and reflection will enable students to develop powerful approaches to scientific inquiry and the presentation of written arguments. By examining the lives of key thinkers as well as classical and contemporary theories and critical ethical issues, students will be challenged to reflect on their lives and create their own philosophical and ethical position statements. Upon successful completion of the course, students will be eligible to take the Advanced Placement English Language and Composition Exam. Students will earn one English credit, which will meet the requirement for English 11, including the Virginia Standards of Learning requirement.

MVGS Humanities II: Applying the Power of Persuasion to World Issues / Government * 244509 (Or 231509 for Humanities credit)

Through the lenses of local, national, and world systems with an emphasis on American government and economy, students will identify scientific issues and problems. Students will defend positions and solutions while cultivating ethical dispositions and leadership skills which can be applied to real-world problems. An emphasis will be placed on rhetoric through formal debate, extemporaneous and prepared speeches, and recognition of opportunities to enter public discussions of current world issues. Upon successful completion of the course, students will be prepared for the Advanced Placement Exam in United States Government and Politics. Students will earn one US Government credit.

MVGS Research I: Introduction to the Fundamentals of the Research Process* 151509

The students' review of literature, analysis of arguments, and evaluation of experiment designs will enable them to explore basic research components; understand concepts such as validity, reliability, and integrity of research; and develop the skills to design, evaluate, and assess their own and others' academic and scientific research. The students will be introduced to a basic understanding of statistics and the technological tools utilized to organize and integrate information, which will enable them to design studies and experiments, gather data, and conduct independent scientific study. Extended project integration with Math, Physics, and Humanities will enable students to engage in meaningful background research, link hypothesis development with experiment and study design, practice hypothesis revision, and develop quality methods of data collection. Practice with and use of a variety of software programs, internet tools, and other forms of technology will enable students to develop competencies across the technological spectrum as they integrate the use of technology into experiment and study design, data collection and analysis, and the publication and presentation of academic research.

MVGS Research Course II: Exploration of Cutting-Edge Science and Technology Fields (Applied Research)* 461009

Students will apply principles of effective research by engaging in academic and scientific research through quantitative or qualitative studies utilizing laboratory experiments, field studies, interviews, and surveys. Students' individual research projects will include a mentorship component to facilitate meaningful research, assist in explorations of cutting edge trends in science and technology, evaluate career opportunities, and promote meaningful interaction with professionals in the academic, scientific, and technology fields. Extended project integration with Math, Physics, and Humanities will enable students to engage in meaningful background research, link hypothesis development with experiment and study design, practice hypothesis revision, and develop quality methods of data collection. Students will develop oral, written, and technology skills through presentation and publication of their research. Students taking the Statistics class will utilize their own collected data to show understanding of statistical analysis methods in conjunction with the MVGS Statistics class.

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