



## **STEM** *Course Descriptions*

The main objective of Science, Technology, Engineering, and Mathematics (STEM) is to offer students a wide range of opportunities from career readiness and hands-on experience to college preparation. Monte Vista High School STEM Classes set high standards for rigorous and engaging study, developing students' innovative, collaborative, and problem-solving skills.

These classes may count as the fourth science or math credit needed for the Comprehensive or Collegiate high school diploma once other science requirements have been met as stated above in the graduation requirements section.

### **3D PRINTING TECHNOLOGY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Teacher Approval and successful completion of Computer Programming, Robotics, Engineering

This course is a project-based course for the self-motivated student who has already completed the prerequisite course. It utilizes an interdisciplinary set of technologies that can be applied to solve real-world problems. Students will work independently and/or form teams to identify a project they would like to design and implement. After projects are identified, classes will be working sessions on these projects.

### **APP BUILDING**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and successful completion of Algebra I.

This is the world of App Inventor, a visual programming tool for building mobile apps. Based on a visual "blocks" programming method that's proven successful even with kids, App Inventor dramatically lowers the barriers to creating apps for Android phones and devices. Who will be the next Flappy Bird creator?

### **AQUATIC & TERRESTRIAL ECOLOGY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Biology (either prior or concurrent)

Students will collect, analyze, and present data related to ecological systems they monitor in class or in the field. Students will also be trained as volunteers for the Colorado Parks and Wildlife program, River Watch, where they will learn how to collect stream water samples and perform several chemical tests to determine the health of the river. Students will also learn how nutrients cycle within ecosystems, and how to manage their own "aquaponics" tank.

### **ASTRONOMY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and successful completion of Algebra I.

This course presents an introduction to the science of Astronomy, including hands-on modern methods of telescope optics and observational astronomy, the birth and evolution of stars, galaxies and the universe, the Solar System and current missions investigating the possibility of life on other planets, such as on Mars.

### **ATHLETIC TRAINING**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

This course is designed to develop knowledge and understanding in order to recognize, prevent, and provide care for various athletic injuries, including but not limited to signs, symptoms, and mechanisms of injuries.

### **COMPUTER PROGRAMMING**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and **successful** completion of Algebra I.

This course emphasizes object oriented programming methodology with an emphasis on problem solving and algorithm development. It also covers the study of data structures, design and abstraction. The course emphasizes the design issues that make programs understandable, adaptable and reusable.

### **FORENSICS**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and **successful** completion of Algebra I.

This course is designed for the student who would like to learn how science, technology, and math are used to solve crimes. Topics discussed include organic and inorganic chemical analysis of physical evidence, principles of serology and DNA analysis, ballistics, fingerprint analysis, facial reconstruction, drug analysis, and forensic entomology.

### **FORESTRY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and **successful** completion of Algebra I.

This course introduces measurement of forest land and vegetation attributes including geographic position, land distance, direction and area, tree size and forest overstory and understory vegetation. It also uses computer software and global positioning systems and geographic information systems in the management of land and forest measurements.

### **INTRODUCTION TO ENGINEERING**

CREDIT: 1.0      LENGTH: One Year      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science teacher.

The major focus of the course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards, and technical documentation.

### **METEOROLOGY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and **successful** completion of Algebra I.

This course is designed for the student who will be learning about current weather maps; structure of the atmosphere and the role of moisture in the development of dew, clouds, and precipitation; air masses, fronts, cyclones, thunderstorms, tornadoes, and hurricanes. Elements of weather forecasting, instrumentation and communication are included.

### **ROBOTICS I - Intro to Robotics (Spring)**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Recommendation from previous science or math teacher and **successful** completion of Algebra I.

This course will use robotics to cover the fundamentals of problem solving, program design, algorithms and programming using an intro-level computer language. A robot is an embedded system of software

and hardware. Programming and building robots applies science, technology, engineering and math (STEM) concepts.

### **ROBOTICS II - Competitive Robotics (Fall)**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 9 - 12

PREREQUISITE: Teacher Approval and completion of Robotics I or Robotics team experience.

This course will strengthen student robotics experience by covering more advanced problem solving, program design, algorithms and programming using a high-level language. Programming and building robots applies science, technology, engineering and math (STEM) concepts. This course includes participation in the BEST Robotics competition as part of the Robotics Team.

### **SCIENCE SEMINAR**

CREDIT: 1      LENGTH: One Year      LEVEL: Grades 10 - 12

PREREQUISITES: Teacher Recommendation and/or Approval

This course involves students conducting rigorous, independent research on Science/Math/Engineering topics of their choice. Project designs can be experimental/manipulative (classic “scientific method”), or technological (such as computer programming, robotics, or engineering). The project will culminate with attendance and competition at the San Luis Valley Regional Science Fair (SLVRSF) held in the spring semester. Throughout this process, students will learn how to manage their time and complete a long-term project, conduct a literature review relating to their topic, write a journal-style research report in APA format, use statistics, create a display, and give oral presentations to peers, teachers, and fellow scientists. Students with projects that showcase excellent design and thorough execution may be chosen to compete at the Colorado Science and Engineering Fair (CSEF) or the International Science and Engineering Fair (ISEF) as determined by a panel of judges at the SLVRSF or CSEF.

### **WEB PAGE DESIGN**

CREDIT: 1      LENGTH: One Year      LEVEL: Grades 10 - 12

PREREQUISITES: Teacher Recommendation

This course is an introduction to website management, website graphics, and animation for students who want to learn how to create and manage web pages. Students will learn how to design websites and upload files to the Internet. One of the primary objectives of the class will be the upkeep, design, and expansion of the Monte Vista School District web sites.

### **ZOOLOGY**

CREDIT: 0.5      LENGTH: One Semester      LEVEL: Grades 10 - 12

PREREQUISITES: Biology (either prior or concurrent)

This course will introduce students to the wide variety of life found on Earth, and the evolutionary relationships between the major groups. All major forms of life will be investigated using labs, videos, experiments, and discussions, and will include prokaryotes (bacteria), protists, fungi, plants, invertebrate and vertebrate animals.