

# **ENGLISH**

## **SMA Honors English 9 (SMA10071) State Code 1130**

**Grade Level:** 9

**Level of Difficulty:** Honors

**Credit:** 1 unit

**Weight:** .025

**Prerequisite:** English 8 or Honors English 8

**Standard of Learning End-of-course Test:** No

**Course Description:** Students work independently and in collaborative groups to make planned oral presentations. Students read and compare fiction and nonfiction texts and make inferences and draw conclusions using explicit and implied textual evidence. Students read and critique literary works from a variety of cultures and apply knowledge of literary terms. Students develop a variety of persuasive and analytical writings, emphasizing their ability to gather diverse information and evaluate that information by identifying misconceptions and possible bias, citing quoted and paraphrased information using either MLA or APA style. Students make oral presentations and apply multimodal communication techniques to access and organize information. Literature and reading study includes additional requirements for classroom and outside of classroom reading. Students utilize technical writing components with a focus on writing for the science and medical industries.

## **SMA Honors English 10 (SMA11071) State Code 1140**

**Grade Level** 10

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** SMA Honors English 9

**Standard of Learning End-of-Course Test:** No

**Course Description:** Students read and compare fiction and nonfiction texts, analyzing the cultural and social function and universal themes of fictional texts from different cultures. Literature study includes poetry, short stories, novels, plays, business documents, and consumer information. Students develop vocabulary with an emphasis on connotations, idioms, classical allusions, and figurative language. Students use the writing process to develop a variety of persuasive and analytical writings, show the relationship among claims, reasons, and evidence from diverse sources, and identify misconceptions and possible bias using either MLA or APA style to credit sources. Students create media messages to show cause and effect relationships between mass media and public opinion trends and create multimodal presentations independently and in small groups.

**Honors English 11 (12021) State Code 1150**

**Grade Level:** 11

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** SMA Honors English 10

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** Students engage in intensive reading and analysis of American informational text and American literature and describe the contributions of other cultures and identify prevalent themes and characterizations reflective of American history and culture. Vocabulary development is focused on connotations, idioms, classical allusions, and figurative language. Students write focused, organized and coherent persuasive and argumentative essays for a variety of audiences. Students create media messages and analyze cause and effect relationships between mass media coverage and public opinion trends. Students create multimodal presentations addressing alternative perspectives. Students work independently and collaboratively, building communication skills. In addition, students deliver and evaluate persuasive and argumentative presentations with an emphasis on the counterargument, as well as engage in additional parallel reading.

**Advanced Placement English Language and Composition (12141) State Code 1196**

**Grade Level:** 11

**Level of Difficulty:** Advanced Placement

**Credit:** 2 Units

**Weight:** .05

**Prerequisite:** SMA Honors English 10

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This is a college-level course designed in accordance with the requirements of the College Board. The Advanced Placement English Language and Composition course provides students who are interested in studying and writing various kinds of analytical and persuasive/argumentative essays on non literary topics with a college-level English emphasis in language, rhetoric, and expository writing. Students also are required to complete summer reading according to each school's College Board approved syllabus. Students in AP English Language and Composition spend their time reading and writing, as well as engaging in discourse about their reading and writing with attention to rhetorical and compositional elements. Through exposure to various genres, voices, and ideas, students' reading experiences are broadened. Their levels of appreciation and enjoyment as well as their critical thinking skills are enhanced. In addition, the students analyze classic works, conduct research, and make an oral presentation. The course culminates in the Advanced Placement examination given in May of each year. Students who enroll in this course should have a comprehensive knowledge of Standard English grammar. This course may be taken instead of SMA Honors English 11 (779).

**Honors English 12 (13021) State Code 1160**

**Grade Level:** 12

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Honors English 11

**Course Description:** Students interpret the meaning of selected masterpieces of world literature and British literature through critical analysis. During the study of the composing process, students focus on rhetoric and logic for the purpose of developing individual style. Students engage in additional parallel reading. Students compose persuasive and argumentative essays for multiple purposes and audiences to create focused, organized, coherent writing in a standard acceptable to the workplace and postsecondary education. Students create media messages and analyze the cause and effect relationships between mass media coverage and public opinion trends. Students work independently and in groups to create persuasive and argumentative multimodal presentations. Students produce a research product synthesizing primary and secondary sources that maintains ethical and legal guidelines for gathering information and using work.

**Advanced Placement English Literature and Composition (13141) State Code 1195**

**Grade Level:** 12

**Level of Difficulty:** Advanced Placement

**Credit:** 2 Units

**Weight:** .05

**Prerequisite:** Honors English 11 or Advanced Placement English Language and Composition

**Course Description:** This is a college-level course designed in accordance with the requirements of the College Board. Advanced Placement English Literature and Composition prepares students by developing their interpretive reading skills and their critical/analytical writing skills on a college level. While emphasizing writing techniques and literary analysis, this course exposes students to a wealth of classical and modern literature. Through intensive study of literature and frequent written exercises, students learn strategies to express ideas in an organized, coherent, and persuasive manner. The course culminates in the Advanced Placement examination given in May of each year. Students also are required to complete summer reading according to each school's College Board approved syllabus. This course may be taken instead of SMA Honors English 12 (780).

**College Composition I & II (13351/13451) State Code DE1600/DE1601**

**Grade Level:** 12

**Level of Difficulty:** Dual Enrollment

**Credit:** 2 Units

**Weight:** .05

**Prerequisite:** SMA Honors English 11

**Course Description:** This rigorous course is offered for dual enrollment between Chesapeake Public Schools and Tidewater Community College. Students will study and produce college-level composition. The first semester course (ENG 111) focuses on developing college-level writing abilities through a variety of types of composition and provides 3 credit hours. The second semester course (ENG 112) focuses on developing argumentative writing through research and analytical writing, and provides another 3 credit hours. Upon successful completion of the both semesters, the student earns both the state of Virginia requisite credit for Grade 12 and 6 credits of college study. Students must complete and pass both semesters to meet Grade 12 graduation requirements. Students should be highly motivated and should possess a strong background in English grammar and usage.

# **SOCIAL STUDIES**

## **SMA Honors Social Studies 9: World History and Geography I (SMA40021) *State Code 2215***

**Grade Level:** 9

**Level of Difficulty:** Honors

**Credit:** 1 unit

**Weight:** .025

**Prerequisite:** Accelerate/Honors Placement requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This course is an in-depth study of the backgrounds and development of world civilizations. Students develop critical thinking skills through analysis and research, essay writing, and discussion. Selected knowledge areas include the role of physical geography as it has influenced and hindered the development of cultures from man's prehistory through the Renaissance. The course introduces the industrialization of key figures, key discoveries, key inventions and innovations in both the fields of science and medicine.

## **SMA Honors Social Studies 10: World History and Geography 1500 A.D. to the Present (SMA41021) *State Code 2216***

**Grade Level:** 10

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Honors Social Studies 9: World History and Geography to 1500 A.D. and Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This course is an in-depth study of the events of world history from the Renaissance through modern times. Selected knowledge areas include the coverage of the role of physical geography as it has influenced and hindered the development of world cultures. Specific attention concentrates on the emergence of strong national states, the age of revolutions, and the problems that exist today in modern nations. Various components of culture are addressed for comparison of similarities and differences of modern nations.

**Advanced Placement: European History (41241) State Code 2399**

**Grade Level:** 10

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This course is a freshman college level study of European history from the period of the Renaissance to the present. This period of emphasis recognizes the major topics covered by recent Advanced Placement European History examinations. The course is designed to cover two semesters, with the triumph of the bourgeoisie as a dividing point. In-depth study will focus on the interpretation of social, intellectual, and political themes that have changed the course of direction for the world. This course may be taken instead of SMA Honors Social Studies 10: World History and Geography (771).

**Honors Social Studies 11: Virginia and United States History (42021) State Code 2360**

**Grade Level:** 11

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** The course is an in-depth study of the period in United States history beginning with the Age of Exploration. Major focus is given to the growth and development of the United States as a world leader. Selected knowledge areas address the various ideas, thoughts, and philosophies that were the backbone of the political, economic, and social contributions of various groups of people throughout the important stages of development.

**Advanced Placement: United States History (42141) State Code 2319**

**Grade Level:** 11

**Level of Difficulty:** Advanced Placement

**Credit:** 2 Units

**Weight:** .05

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This course is a freshman college level study of American history from colonization to the present with special emphasis during the period 1790 to 1965. This period of emphasis recognizes the major topics covered by recent Advanced Placement American History examinations. The course is designed to cover two semesters with the period of Reconstruction (1877) as the dividing point. This course may be taken instead of SMA Honors Social Studies 11: Virginia and United States History (792).

**Dual Enrollment United States History 1 & 2 (42351/42451) State Code**

**Grade Level:** 11

**Level of Difficulty:** Dual Enrollment

**Credit:** 2 Credits (1 Elective and 1 Social Science)

**Weight:** 0.05 per credit

**Prerequisite:** *Honors Placement Requirements Recommended; Students must have placed into English 111 at TCC*

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This rigorous course is offered for dual enrollment between Chesapeake Public Schools and Tidewater Community College. Students will study and survey college-level United States History from its beginning to the present. The first semester course (HIS 121) focuses on United States History from Colonization through Reconstruction and provides three credit hours. The second semester course (HIS 122) surveys from Reconstruction to the Present, and provides another three credit hours. Upon successful completion of both semesters, the student earns both the state of Virginia requisite credit for VA/US History and six credits of college study. Students must complete and pass both semesters to meet graduation requirements. Students should be highly motivated and must have placed into English 111 at TCC as a co-requisite.

**Honors Social Studies 12: Virginia and United States Government (43021) *State Code 2440***

**Grade Level:** 12

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course is an in-depth study that provides a comprehensive analysis of the American political and economic system with a comparison to that of other political and economic systems; and, a comprehensive analysis of the national court system with emphasis on court structure and landmark court cases. Major focus is given to the examination of civil rights and civil liberties. Local government is emphasized both through the relationship with the state and federal government and with current issues.

**Advanced Placement: Government and Politics (43141) *State Code 2445***

**Grade Level:** 12

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course is a freshman college level study of a critical perspective on government and politics in the United States. This course involves both the study of general concepts used to interpret American politics (local, state, and national levels) and the analysis of specific case studies familiarizing the student with various institutions, groups, beliefs and ideas that make up the American political reality. The course presents a thematic approach and recognizes the major topics covered by recent Advanced Placement Government and Politics examinations. This course may be taken instead of SMA Honors Social Studies 12: Virginia and United States Government (794).



# **MATH**

## **SMA Honors Geometry (SMA22071) *State Code 3143***

**Grade Level:** 9

**Level of Difficult:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Algebra 1

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** Honors Geometry includes the study of properties of geometric figures, trigonometric relationships, and reasoning to justify conclusions. Emphasis is on two- and three-dimensional reasoning skills, coordinate and transformational geometry, and the use of geometric models to solve problems. Students must exhibit strong algebraic skills to be successful in this fast-paced course where geometry principles are rigorously applied in order to demonstrate logical, step-by-step problem solving. Hands65 on investigational techniques are used to foster student understanding of geometry topics. Additional trigonometric topics, an emphasis on symbolic knowledge, and geometric probability are included in this honors course. Students analyze real-world applications and problem-solving techniques of mathematical principles as they relate to science and medicine.

## **SMA Honors Algebra 2/Trigonometry (SMA23271) *State Code 3137***

**Grade Level:** 9 or 10

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Geometry

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** This course combines all of the traditional Algebra 2 and Trigonometry objectives with additional topics including probability and statistics. Emphasis is placed on matrices, functions, graphing and trigonometry. Students demonstrate proficiency in solving problems using algebraic and graphing methods and a graphing calculator. Students use real-world applications and problem-solving of mathematical principles as they relate to science and medicine.

**SMA Mathematical Analysis (SMA25071) State Code 3162**

**Grade Level:** 10 or 11

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Standard of Learning End-of-Course Test:** No

**Prerequisite:** Trigonometry/Probability and Statistics (3149)

**Course Description:** This comprehensive course is intended to develop student understanding and application of algebraic and transcendental functions, parametric and polar equations, sequences and series, and vectors. The content of this course will help prepare the student for Calculus. Calculators and graphing utilities are used as 67 tools to verify and investigate mathematical concepts and ideas.

**SMA Calculus (SMA25171) State Code 3178**

**Grade Level:** 11 or 12

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Standard of Learning End-of-Course Test:** No

**Prerequisite:** SMA Honors Mathematical Analysis (785)

**Course Description:** This course is intended for students who have a thorough knowledge of analytic geometry, and functions (including trigonometric functions, logarithmic functions, and exponential functions). The course provides students with a study of limits, continuity of functions, the derivative and its applications, and the definite integral and its applications. All topics will be investigated analytically, numerically and graphically. Calculators and graphing utilities will be used as a tool to verify and investigate mathematical concepts and ideas. This course can be used to prepare students for the rigors of Advanced Placement Calculus AB (25241).

**Computer Science (27011) State Code 3200**

**Grade Level:** Any grade level with appropriate prerequisite requirement

**Level of Difficulty:** Academic

**Credit:** 1

**Credit Weight:** None

**Prerequisite:** Algebra II or currently enrolled in Algebra II (or teacher recommendation with an appropriate placement test can be considered)

**Course Description:** This course provides a foundation for Advanced Placement Computer Science with topics that include: computer systems, algorithmic analysis, objects and primitive data, data structures, selection and control statements, Boolean logic, writing and implementing classes in an OOPs environment, arrays, lists, inheritance, and polymorphism. Students will learn to write computer programs that satisfy output conditions of an initial problem statement. The course may conclude with Web Applets and GUI input/output implemented in a complete student-designed application.

**Advanced Placement Calculus - AB (25241) State Code 3177**

**Grade Level:** 11 or 12

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Advanced Placement End-of-Course Test:** Yes

**Prerequisite:** SMA Calculus (786)

**Course Description:** This course is equivalent to a first semester college calculus course. The topics are aligned with the College Board Advanced Placement Course Description which states, "Calculus AB is primarily concerned with developing the students' understanding of the concepts of calculus and providing experience with its methods and applications. The course emphasizes a multi representational approach to calculus, with concepts, results, and problems being expressed graphically, numerically, analytically, and verbally. The connections among these representations also are important" (www.collegeboard.com). Graphing utilities are mandatory but will be used sparingly. Visit the College Board website for a detailed course description. Visit the College Board website for a detailed course description. ([www.collegeboard.com](http://www.collegeboard.com))

**Advanced Placement Calculus - BC (25341) State Code 3177**

**Grade Level:** 11 or 12

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Advanced Placement End-of-Course Test:** Yes

**Prerequisite:** Advanced Placement Calculus AB (789)

**Course Description:** This is a challenging and demanding course that is equivalent to a second semester college calculus course. The topics are aligned with the College Board Advanced Placement Course Description which states that Calculus BC contains "extensions of Calculus AB rather than an enhancement; common topics require a similar depth of understanding" (www.collegeboard.com). New topics are sequences and series, parametric and polar functions, Euler's method, improper integrals, and various integration techniques. Visit the College Board website for a detailed course description. Graphing utilities are mandatory but will be used sparingly. A thorough review of all topics covered in Advanced Placement Calculus AB and BC will be conducted in preparation for the national exam.

**Advanced Placement Computer Science (27141) State Code 3185**

**Grade Level:** Any grade level with appropriate prerequisite requirement

**Level of Difficulty:** Advanced Placement

**Credit:** 1

**Weight:** 0.05

**Prerequisite:** Algebra II Standard of Learning

**Course Description:** The College Board describes Advanced Placement Computer Science as a course that “emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development and is meant to be the equivalent of a first semester college level course in Computer Science”

([www.collegeboard.com](http://www.collegeboard.com)). Visit the College Board website for a detailed course description.

**Advanced Placement Statistics (24241) State Code 3192**

**Grade Level:** 12

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Advanced Placement End-of-Course Test:** Yes

**Prerequisite:** SMA Algebra II/Trigonometry (787)

**Course Description:** The topics for this course are aligned with the College Board Advanced Placement Course Description. It is stated “the purpose of this course is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: Exploring Data...Sampling and Experimentation...Anticipating Patterns...Statistical Inference.”

Visit the College Board website for a detailed course description.

([www.collegeboard.com](http://www.collegeboard.com))

# **SCIENCE**

## **SMA Principles of Earth Systems (SMA37071) *State code 4210***

**Grade Level:** 9

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Accelerated/Honors Placement Requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** Principles of Earth Systems is a laboratory course, which connects the study of the Earth's composition, structure, processes, and history; its atmospheres, fresh water, and oceans; and its environment in space. This course stresses the interpretation of maps, charts, tables, and profiles; the uses of technology to collect, analyze, and report data; and the utilization of science skills in systematic investigations. This is a very rigorous course with a strong research component that uses the experimental design model of investigations. Principles of Earth Systems students will be challenged to learn, research, and utilize hand-on experiments in greater depth. Students formulate a basic understanding of and implied actions for the introduced science and medical issues.

## **SMA Contemporary Science Investigations in Biology (SMA37271) *State Code 4310***

**Grade Level:** 9

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Principles of Earth Systems

**Standard of Learning End-of-Course:** Yes

**Course Description:** This course is designed to give students a detailed, in-depth understanding of living systems. Emphasis is placed on the skills necessary to examine scientific explanations, to conduct controlled experiments, to analyze and communicate information, and to use scientific literature. The history of biological thought, and the evidence that supports it, is explored; they provide the foundation for scientific investigation. This rigorous course contains strong research components, which enable students to apply scientific concepts. Students will learn and research, utilizing both classroom experimentation and literature reviews from written and electronic resources. Students will utilize medical terminology and current science and medical trends/issues in our society.

**SMA Honors Medicinal Chemistry (SMA37671) State code 4410**

**Grade Level:** 10

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Accelerate/Honors Placement requirements

**Standard of Learning End-of-Course Test:** Yes

**Course Description:** Medicinal Chemistry is a laboratory course, which allows the students to conduct laboratory experiments which involve short and long-term bacterial studies as well as computer modeling and basic drug design. Medicinal and pharmaceutical research is an integral part of the health professions. Through this course, students will apply their knowledge of the life sciences to extend their understanding of biochemistry and pharmacology. This course focuses on pharmaceutical development practices and strategies at the molecular level. In addition, they will investigate the structure, function, and therapeutic administration of chemical compounds. Students will write medical journal quality research papers, which reinforce topics that will be emphasized throughout the course. The course activities will emphasize research skills; critical thinking and problem solving will be emphasized. These skills will be encouraged through inquiry-based activities and challenging research investigations.

**SMA Astronomy (SMA37171) State code 4260**

**Grade Level:** 10<sup>th</sup> or 11<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Academy Placement Requirements

**Standard of Learning End-of-Course Test:** No

**Course Description:** Astronomy is a laboratory course, which connects the study of the Earth's celestial coordinates, telescopes, the Solar System, the orbit of the moon, H-R diagrams, the nature of light, and the age of the Universe. As students learn more about astronomy, they will appreciate just how much astronomy has affected and continues to affect their lives. This course is designed to give students an in-depth understanding of the universe. The course is focused on organizing facts into logical hypothesis, testing that hypothesis, and coming up with a feasible conclusion. The course requires investigating new and historical astronomy, utilizing the newest technology, and the use of deductive reasoning.

**SMA Forensic Science (SMA37771) *State code 4610***

**Grade Level:** 10<sup>th</sup> or 11<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Prerequisite:** Academy Placement Requirements

**Standard of Learning End-of-Course Test:** No

**Course Description:** Forensic Science is a laboratory course, which allows the students to take on the various roles of a crime scene investigator, scientist, and medical examiner in order to collect and evaluate evidence in a problem-solving environment. Students will develop scientific bench techniques necessary for the handling and evaluation of evidence. Students will develop the field skills necessary to collect and maintain a chain of evidence, explore the history of DNA studies and the current standard acceptance of DNA in courts, and explore career opportunities involved in the medical, law enforcement, scientific, and legal aspects of forensic investigation.

**SMA Human Anatomy and Pathophysiology of Human Systems (SMA38171) *State code 4611***

**Grade Level:** 10<sup>th</sup> or 11<sup>th</sup>

**Level of Difficulty:** Intensified Honors

**Credit:** 1 Unit

**Prerequisite:** Academy Placement Requirements

**Standard of Learning End-of-Course Test:** No

**Course Description:** Anatomy and Pathophysiology is a laboratory course, which allows the students to explore each system of the body learning the main anatomical features with an emphasis on understanding the relationship between structure and function. The students will also explore and gain knowledge and understanding of the physiological systems of the body and the interrelationship of the systems. They will learn about some of the most common infections, disorders and diseases focusing on etiology, clinical manifestations, signs and symptoms, and treatment/therapies of each infection/disorder/disease. This class will present critical thinking/problem solving questions and scenarios and focus on problem based learning or case studies. The critical thinking problems are geared at stimulating the student to speculate on the physiology and pathophysiology of the body systems.

**Honors Physics (33021) State Code 4510**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** 0.025

**Prerequisite:** Accelerated/Honors Placement Requirements

**Science Prerequisite(s):** Principles of Earth Systems, CSI in Biology and Medicinal Chemistry are Strongly Recommended

**Mathematics Prerequisite(s):** Algebra II

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course emphasizes a more complex understanding of experimentation, the analysis of data, and the use of reasoning and logic to evaluate and validate evidence. The use of mathematics (including algebra, inferential statistics, and trigonometry) is an important component. A conceptual framework of the physical systems and the laws governing matter and energy are the primary objectives of this course. The practical application of physics in other areas of science, the use of technology and the role of physics in the world are emphasized.

**SMA Animal Science (SMA37571) State code 4611**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Accelerated

**Credit:** 1 unit

**Weight:** TBD

**Prerequisite:** Earth Systems, CSI in Biology, Medicinal Chemistry and Human Anatomy and Pathophysiology.

**Standard of Learning End-of-Course Test:** No

**Course Description:** Animal Science is a laboratory course, which allows the student to be introduced to the foundations for veterinary medical language and basic anatomy & physiology. Positional, directional and planes of body and body cavity terminology will be discussed. The course will introduce basic concepts and principles of animal nutrition, growth, health, behavior, reproduction, and genetics, as well as practical applications, such as disease prevention, genetic selection, and crossbreeding systems.



**SMA Human Movement Science (SMA38371) State code 4612**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Accelerated

**Credit:** 1 unit

**Weight:** .05

**Prerequisite:** Earth Systems, CSI in Biology, Medicinal Chemistry and Human Anatomy and Pathophysiology.

**Standard of Learning End-of-Course Test:** No

**Course Description:** Human Movement Science is a laboratory course, which allows the student to learn proper anatomy, physiology, and biomechanical functions of the joints, muscles and ligaments in the body and will be able to identify and make decisions about injuries. Sports medicine is a branch of healthcare devoted to the application of medical knowledge and expertise to the prevention, diagnosis, treatment, and management of injuries related to participation in sports, exercise, and other physical and recreational activities. This course will help students get a better understanding of how sports medicine factors into athletic injuries. Each student will participate in practical applications of modern athletic training including post injury care, application and instruction in Physical Therapy techniques, Sports Massage, Strength & Conditioning and athletic Rehabilitation therapy. At the end of the course, students will be CPR and First Aid Certified.

**SMA Molecular Genetics and Biotechnology (SMA37471) State code 4611**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Accelerated

**Credit:** 1 unit

**Weight:** .05

**Prerequisite:** Earth Systems, CSI in Biology, and Medicinal Chemistry.

**Standard of Learning End-of-Course Test:** No

**Course Description:** Molecular biotechnology results from the convergence of many areas of research, such as molecular biology, microbiology, biochemistry, immunology, genetics, and cell biology. It is an exciting field fueled by the ability to transfer genetic information between organisms with the goal of understanding important biological processes or creating a useful product. Students will learn about genetic engineering and why new vaccines are being created, how plants and animals are being genetically altered to meet the world's demands, DNA fingerprinting, stem cell research, and how microbes are being harvested for energy efficiency. The students will connect what is learned in the classroom with instruction and experiences related to the science and medical fields. The tools of molecular biotechnology can be applied to develop and improve drugs, vaccines, therapies, and diagnostic tests that will improve human and animal health. Molecular biotechnology has applications in plant and animal agriculture, aquaculture, chemical and textile manufacturing, forestry, and food processing. Every aspect of our lives in the coming decades will be affected by this dynamic field.

**SMA Advanced Placement Environmental Science (SMA38071) State code 4270**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 unit

**Weight:** .05

**Prerequisite:** Earth Systems, CSI in Biology, and Medicinal Chemistry.

**Standard of Learning End-of-Course Test:** No

**Course Description:** The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. This course is designed to prepare students for the Advanced Placement examination in chemistry to receive college credit. Completion of an investigative research project is an expectation of all Advanced Placement Environmental Science students.

**SMA Advanced Placement Biology (37371) State Code 4370**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Level of Difficulty:** College Level

**Prerequisite(s):** Earth Systems, CSI in Biology, and Medicinal Chemistry

**Standard of Learning End-of-Course Test:** No

**Course Description:** Advanced Placement Biology is designed to place emphasis upon the major topics covered in introductory college level biology courses. Molecular, cellular, organism, and population biology are stressed. Students also develop an understanding of the characteristics, the unity, and the diversity of living things while collecting, analyzing, and interpreting biological data. This course is also designed to prepare students to achieve a satisfactory score on the Advanced Placement examination in biology to receive college credit. In meeting the rigorous course standards, students will be encouraged to share their ideas, use the language of biology, discuss problem-solving techniques, and communicate effectively. Advanced Placement biology students will be challenged to learn, to research, utilizing both classroom experimentation and literature reviews from written and electronic resources, and to present topics in biology in greater depth. Completion of an investigative research project is an expectation of all Advanced Placement biology students.

**SMA Advanced Placement Chemistry (37871) State Code 4470**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** .05

**Level of Difficulty:** College Level

**Science Prerequisite(s):** Earth Systems, CSI in Biology, Medicinal Chemistry

**Mathematics Prerequisite(s):** Algebra II and a higher-level math course

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course is designed to place emphasis on the major topics covered in introductory college level chemistry courses. This college level course will provide a depth of understanding of the fundamentals and competencies needed to apply chemical calculations and the mathematical formulation of principles. This course is designed to prepare students for the Advanced Placement examination in chemistry to receive college credit. In meeting the rigorous course standards, students will be encouraged to share their ideas, use the language of chemistry, discuss problem-solving techniques, and communicate effectively. Advanced Placement chemistry students will be challenged to learn, to research, utilizing both classroom experimentation and literature reviews from written and electronic resources, and to present topics in chemistry in greater depth. Completion of an investigative research project is an expectation of all Advanced Placement chemistry students.

**Advanced Placement Physics 1 (33041) State Code 4573**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** 0.05

**Science Prerequisite(s):** Principles of Earth Systems, CSI in Biology and Medicinal Chemistry are Strongly Recommended.

**Mathematics Prerequisite(s):** Successful Completion of Algebra II is required

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course is designed to place emphasis on principal topics covered in a first-semester college course in algebra-based physics. AP Physics 1 is Algebra-Based. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; mechanical waves and sound. It will also introduce electric circuits. This course is designed to prepare students for the Advanced Placement examination in AP Physics 1. Completion of an investigative research project is an expectation of all Advanced Placement physics students.

**Special Note:** Starting the 2014-2015 school year, AP Physics B was replaced by AP Physics 1 and AP Physics 2.

**Advanced Placement Physics 2 (33142) State Code 4574**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** 0.05

**Science Prerequisite(s):** Principles of Earth Systems, CSI in Biology and Medicinal Chemistry are Strongly Recommended. AP Physics 1 is required.

**Mathematics Prerequisite(s):** Successful Completion of Algebra II is required and One Higher Math Course is Highly Recommended

**Standard of Learning End-of-Course Test:** No

**Course Description:** This course is designed to place emphasis on principal topics covered in a second-semester college course in algebra-based physics. AP Physics 2 is Algebra-Based. The course covers fluid mechanics; thermodynamics; electricity and magnetism; optics; atomic and nuclear physics. This course is designed to prepare students for the Advanced Placement examination in AP Physics 2. Completion of an investigative research project is an expectation of all Advanced Placement physics students.

**Special Note:** Starting the 2014-2015 school year, AP Physics B was replaced by AP Physics 1 and AP Physics 2.

**SMA Advanced Senior Seminar (SMA38271) State code 4612**

**Grade Level:** 12<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Level of Difficulty:** Intensified Honors

**Science Prerequisite(s):** Earth Systems, CSI in Biology and/or Medicinal Chemistry, a minimum of 4 additional elective SMA courses and a minimum of 20 hours of Job Shadowing.

**Standard of Learning End-of-Course Test:** No

**Course Description:** The goal of the Science and Medicine Academy is to introduce students to the vast field of science and medical careers. The focus is to give each student rigorous academic coursework necessary to compete in post-secondary institutions. The student will be introduced to a work-related learning experience where they will develop hands on work experience in a certain occupational field or gain the relevant knowledge and skills required to enter into a particular career field. This internships will be short term in nature with the primary focus of getting some on the job training and taking what's learned in the classroom and applying it to the real world. This advanced seminar will help develop professional work habits; provides an understanding of corporate cultures, and offer a platform to compare differences in work styles. Students will be required to complete a minimum of 60 hours of hands on training. Students must complete an internal assessment in the form of a presentation and an external assessment in the form of a 1200-1600 word essay that addresses the students' skills, attitude and awareness of the career field of internship.

# **PLTW (Biomedical Sciences)**

## **Principles of Biomedical Science (PBS)**

**Grade Level:** 10<sup>th</sup> – 12<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Level of Difficulty:** Intensified Honors

**Science Prerequisite(s):** Earth Systems, CSI in Biology and/or Medicinal Chemistry

**Course Description:** In the introductory course of the PLTW Biomedical Science program, students explore concepts of biology and medicine to determine factors that led to the death of a fictional person. While investigating the case, students examine autopsy reports, investigate medical history, and explore medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, basic biology, medicine, and research processes while allowing them to design their own experiments to solve problems.

## **Human Body Systems (HBS)**

**Grade Level:** 10<sup>th</sup> – 12<sup>th</sup>

**Level of Difficulty:** Honors

**Credit:** 1 Unit

**Weight:** .025

**Level of Difficulty:** Intensified Honors

**Science Prerequisite(s):** Earth Systems, CSI in Biology and/or Medicinal Chemistry and Principles of Biomedical Sciences (PBS)

**Course Description:** Students examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis. Exploring science in action, students build organs and tissues on a skeletal Maniken®; use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration; and take on the roles of biomedical professionals to solve real-world medical cases.

**Medical Interventions (MI)**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** 0.05

**Science Prerequisite(s):** Principles of Earth Systems, CSI in Biology and Medicinal Chemistry, PBS and HBS

**Course Description:** Students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection; screen and evaluate the code in human DNA; evaluate cancer treatment options; and prevail when the organs of the body begin to fail. Through real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics.

**Biomedical Innovation (BI)**

**Grade Level:** 11<sup>th</sup> or 12<sup>th</sup>

**Level of Difficulty:** Advanced Placement

**Credit:** 1 Unit

**Weight:** 0.05

**Science Prerequisite(s):** Principles of Earth Systems, CSI in Biology and Medicinal Chemistry, PBS, HBS, and MI

**Course Description:** In the final course of the PLTW Biomedical Science sequence, students build on the knowledge and skills gained from previous courses to design innovative solutions for the most pressing health challenges of the 21st century. Students address topics ranging from public health and biomedical engineering to clinical medicine and physiology. They have the opportunity to work on an independent design project with a mentor or advisor from a university, medical facility, or research institution.