

# ***Academy of Aerospace and Engineering***

at The Greater Hartford Academy of Mathematics & Science



## **Program of Studies**

Curriculum & Course  
Description Catalog

**2011-2012**



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### **Active Learner**

## **General Course Information**

### **Course Numbering**

Course numbers are provided in the program of studies to help students make appropriate course selection based on grade level.

100 level:	Grade 9 Courses
200 level:	Grade 10 Courses
300 level:	Grade 11 and 12 Courses – these are courses open to both Juniors and Seniors, especially in mathematics and science.
400 level:	Grade 12 Courses – these are courses are primarily intended to be Senior level courses, although they are open to all students that meet all prerequisites and have instructor consent.
500 level:	Independent Study/Research Courses

### **Course Designations**

Course level designations are provided as a general guideline to help students select courses of the appropriate level. Most courses offered at the Academy are offered at the honors level and there are no courses offered below the college preparatory level.

College Preparatory:	Courses designated as College Preparatory are those courses that would normally be included in this level for the appropriate grade at most high schools. These courses provide the general skill and knowledge framework need for success at college.
Honors:	Courses designated as Honors are conducted with the higher level of intensity, course load and rigor than college preparatory courses. These specialized courses go beyond the normal material covered by similar courses at that grade level in scope or rigor. This includes some courses in math and science that are equal to the rigor of advanced placement courses, but for which an AP assessment does not exist.
Advanced Placement:	Courses at the Academy that complete the standard nationally recognized AP curriculum are designated as AP level. These are college level courses and demand students have the skills and motivation to manage a fast paced and demanding workload. Students are expected to be active learners that take responsibility and ownership for their own learning.

**Advanced Placement**

Courses at the Academy range from Honors to College-level in terms of intensity, course load and assessment. Students interested in taking advanced placement exams should select the following courses.

**Science Courses**

Biology:	AP Biology
Chemistry:	AP Chemistry
Physics:	Classical Mechanics (AP Physics C) Electricity and Magnetism (AP Physics C)

**Mathematics Courses**

Statistics:	AP Statistics
Calculus AB:	AB Calculus
Calculus BC:	BC Calculus
Computer Science:	AP Computer Science

**Humanities Courses**

World History  
United States History  
English Language and Composition  
English Literature and Composition

**Course Selection & Faculty Advisement**

Ninth and tenth grade students have limited choices for course selection. Students in the ninth and tenth grade take foundational classes in order to prepare them for advanced electives in the eleventh and twelfth grades.

Faculty is available for course selection advisement for all elective classes. Students should consult with their guidance counselor for course selection. Students should discuss course selection with their current math teacher for mathematics course selection and math teachers will provide recommendations for all math courses.

Eleventh and twelfth grade students are able to choose their program of study for math and science programs from an extensive list of electives. It is preferable and highly recommended that upon entrance into the 11<sup>th</sup> grade students plan their two-year Program of Study.

**Course Placement**

Course placement for incoming students is based on placement testing. All incoming students are required to take a placement test that includes a math placement test and a Degrees of Reading Power test. In addition, students

enrolling beyond the ninth grade will also be placed based on a review of their high school transcripts.

Math placement for current students will be based on the placement recommendation from the student's current math teacher.

Humanities placement for Advanced Placement courses will be based on the recommendation of the current math teacher and the consent of the AP teacher.

### **Grade Level Promotion**

Promotion to the next grade is based on the total credits earned by the student. In order for students to move to the next grade they must meet the following criteria:

- Students who have accrued **7.75** or more credits, are promoted to the 10<sup>th</sup> grade.
- Students who have accrued **15.75** or more credits, are promoted to the 11<sup>th</sup> grade.
- Students who have accrued **23.5** or more credits, are promoted to the 12<sup>th</sup> grade.

### **Grade Level Program of Studies**

The general program of studies by grade level is provided below. Students actual course of studies will vary based on individual student needs and successful advancement towards graduation.

#### **Grade 9 Curriculum**

- Foundations in Physics
- Foundations in Earth Science
- Mathematics
- U.S. History
- American Literature
- Spanish/Latin
- Arts Electives

#### **Grade 10 Curriculum**

- Foundations in Biology
- Foundations in Chemistry
- Mathematics
- Power of Voice
- Civics
- Spanish/Latin
- Arts Electives

### **Grade 11 Curriculum**

- World History/AP World History
- World Literature/ AP English Literature and Composition
- Spanish/Latin
- Mathematics
- Science Elective
- Math or Science Elective
- Arts Electives

### **Grade 12 Curriculum**

- Sociology/Psychology/AP U.S. History
- Research and Writing /College and Creative Writing/ AP English Language and Composition (**Note: AP English Literature and Composition will be the only 12<sup>th</sup> grade English course offered for the 2011-2012 school year**)
- Spanish/Latin
- Mathematics
- Science Elective
- Math or Science Elective
- Arts Electives

### **Minimum Graduation Requirements**

In order to graduate from the Academy of Aerospace and Engineering, a student must have earned a minimum of 28.0 credits and must have met the credit distribution requirements. Students must also demonstrate what they know and are able to do by meeting graduation performance requirements in reading, writing, and mathematics.

In order to progress in math and science courses, you must achieve a grade of 70 or above. This requirement may be waived by administration.

### **Humanities**

4 years of English

3 years of Social Studies, including:

1 year in U.S. History

½ credit in Civics/U.S. Government

1 year of Arts or Vocational Education

3 years in world language

### **Mathematics**

4 years of mathematics, including successful completion of one course beyond Algebra II

**Sciences**

4 years of science including:

1 year of Biological Science

1 year of Physical Science (Physics, Chemistry, Biology)

**Applied Arts**

½ credit in Technology or Computer Science/Engineering

**Physical Education/Health & Personal Development**

1 credit of Physical Education

½ credit of Health

**Elective Courses**

8 credits including a minimum of:

2 ½ credits of math, science, or engineering electives  
(beyond minimum requirements)

½ credit in Wellness Seminar

1 credit for Senior Project

Please note that certain requirements are indicated in years while others are indicated in credits. Requirements in years call for the completion of a specific number of full year courses or the equivalent, with a minimum of 1.0 total credits per year.

**Total Requirements for Graduation ..... 28.0 Credits**

## Academy of Aerospace and Engineering High School Curriculum Map

<b>Grade</b>	<b>English</b>	<b>Social Studies</b>	<b>World Language</b>	<b>Mathematics</b>	<b>Science</b>	<b>Math/Science</b>	<b>Arts</b>
<b>Freshman</b>	American Literature	U.S. History	Spanish/Latin	Mathematics	Foundations in Earth Science	Foundations in Physics	Arts Electives
<b>Sophomore</b>	Power of Voice	Civics	Spanish/Latin	Mathematics	Foundations in Biology	Foundations in Chemistry	Arts Electives
<b>Junior</b>	World Literature or AP English Language and Composition	World History or AP World History	Spanish/Latin	Mathematics	Science Elective	Math or Science Elective	Arts Electives
<b>Senior</b>	Research and Writing/College and Creative Writing or AP English Literature and Composition	Sociology Psychology or AP U.S. History	Spanish/Latin	Mathematics	Science Elective	Math or Science Elective	Arts Electives

## **Course Descriptions**

Not all courses are offered every semester or every year. Please consult the Course Selection Form for the year in question to determine what is offered that year.

### **BIOLOGY**

#### **BIO 201**

##### **Foundations in Biology + Health in the 21<sup>st</sup> Century**

1.25 Credit  
Honors

*Prerequisite: None*

Foundations in Biology is a course designed to develop a comprehensive understanding of fundamental concepts and principles in the life sciences. Students will explore topics at the molecular, cellular, systemic, and organismal levels. Students will be required to apply their understanding of biological systems to pertinent questions in the Life Sciences. Topics that will be covered include; the origin of life, cellular physiology, cellular interaction and organ system physiology, molecular and evolutionary genetics, organismal interactions and environmental biology. This course will have a strong experimental laboratory component and will be integrated with the Foundations in Chemistry course when covering the fundamentals of biochemistry. Health in the 21<sup>st</sup> Century is a course that is interwoven into the biology curriculum in the second semester. This course meets all district and state requirements for health credit.

#### **BIO 301**

##### **Molecular and Cellular Biology**

0.625 Credit  
Honors

*Prerequisite: General Biology*

Molecular and Cell biology integrates the disciplines of cytology, biochemistry, and genetics to understand how cells live and reproduce. Students in this course will study cell structure and function, emphasizing the molecular components, metabolism, organelles, motility, growth and division. The molecular biology of cells and the regulation of cellular processes are emphasized. A strong emphasis will be placed on student developed laboratory research projects. Laboratory research will include the study of enzyme kinetics, protein structure, quantitative analysis of biomacromolecules, microscopy and cell culturing.

#### **BIO 302**

##### **AP Biology**

1.25 Credit  
Advanced Placement

*Prerequisite: General Biology*

This course will cover the advanced placement curriculum in biology from atoms to zoology. Students will study general chemistry as it relates to macromolecules and apply this to an understanding of structural features and metabolism in cells. With this as a foundation to build on, they will explore genetics and biotechnology, anatomy and physiology in organs and organ systems, the phylogeny and evolution of organisms, and interactions between organisms and their environment.

**BIO 311**  
**Botany**0.625 Credit  
Honors*Prerequisite: General Biology*

Offered as a course for independent study. This course will provide a foundation for understanding the biology of plants. Through a combination of readings and laboratory investigations, the student will explore the phylogeny and physiological adaptations of plants. They will also explore the important role plants have played in providing a context for evolution of life on earth, including the evolution of complex human societies.

**BIO 321**  
**Molecular and Mendelian Genetics**0.625 Credit  
Honors*Prerequisite: General Biology**Co requisite: Precalculus*

Molecular and Mendelian Genetics integrates modern genetic and genomic sciences with classical organismal genetics and patterns of inheritance. Students will study the basic principles of molecular genetics including the transmission and organization of the genetic material in prokaryotes and eukaryotes, the molecular biology of nucleic acids and information transfer, mutation and mutagenesis, and gene regulation. The study of Mendelian Genetics will include the analysis of mechanisms of inheritance with emphasis on the nature of the gene, gene regulation and expression, and genetic changes in populations. Laboratory research in this course will include DNA isolation and analysis, gel electrophoresis, RFLP and PCR analysis, bacterial transformation, and mathematical modeling of gene regulation and inheritance.

**BIO 331**  
**Biodiversity**0.625 Credit  
Honors*Prerequisite: General Biology*

Offered as a course for independent study. Life is a continuum, from the simplest bacterial cells to the most complex multi-cellular bodies of plants and animals. This great diversity of forms is the product of natural selection and other evolutionary mechanisms operating during the last 3.8 million years of earth's history. Students will explore the unfolding of earth's biological history from the humble origins of life to its current diversity in light of the combination of geological events and evolutionary mechanisms that produced it. Students will also explore the field of conservation biology as its tools become ever more important in preserving the diversity of life.

**BIO 341**  
**Evolutionary Biology**0.625 Credit  
Honors*Prerequisite: General Biology*

Offered as a course for independent study. While evolutionary theories predate Darwin, this field found in the mechanism that he proposed the seeds for a program of scientific research which has been enormously productive. This mechanism, natural selection, is still the best scientific explanation for the emergence of the most complex of biological structures. In the century and a half that has passed since Darwin, additional mechanisms have been discovered

and new revisions to evolutionary theory have occurred and are occurring. Evolutionary biology offers a scientific approach for addressing some of the most pressing questions of our time from why we get sick to how we behave. Students in this course will explore the intersection between ecology and evolutionary biology using tools from both fields. Topics that will be addressed in this course include population genetics, levels of selection, game theory, behavioral ecology, the origins of morality and culture, cognitive science, evolutionary psychology, social dominance theory, and life history theory.

**BIO 351**  
**Human Evolution**

0.625 Credit  
Honors

*Prerequisite: General Biology*

The combined work of primatologists, geneticists, paleontologists, physical anthropologists and other specialists have greatly expanded our understanding of human origins. In this course, students will explore human history from the origin of our primate ancestors to the emergence of fully modern *Homo sapiens*. They will learn about our anatomical and physiological evolution, including the development of complex brains and the implications this had for living in large cooperative societies.

**BIO 361**  
**Biology Seminar I**

0.625 Credit  
Honors

*Prerequisite: General Biology*

This course is intended for students who wish to extend their knowledge of special topics in biology with readings and discussions. The focus of this year's seminar will be on developing a logical framework for understanding psychological adaptations as well as disease and disorders from an evolutionary perspective. These are the goals of the rapidly growing field of Darwinian Medicine whose practitioners hope to improve health practices and interventions as a result of taking our evolutionary past into account.

**BIO 366**  
**Biology Seminar II**

0.625 Credit  
Honors

*Prerequisite: General Biology*

This course is intended for students who wish to extend their knowledge of special topics in biology with readings and discussions. Topics will vary and be determined by the interest of students and instructors.

**BIO 371**  
**Biotechnology and Bioengineering**

0.625 Credit  
Honors

*Prerequisite: General Biology and Chemistry*

This course will introduce students to the theoretical aspects of Biotechnology & Bioengineering and societal issues arising from this new technology. Students will review primary research literature to explore new aspects of biotechnology and bioengineering. Students will have the opportunity to investigate an area of their own interest utilizing various

biotechnologies. Hands on laboratory activities will reinforce theoretical information and teach lab safety, data analysis, the scientific method, and related computer skills.

**BIO 381**  
**Anatomy and Physiology I**

0.625 Credit  
 Honors

*Prerequisite: one course each in biology and chemistry*

This course is designed for students interested in biomedical research or the medical field. Students will learn about the structural organization of the human body and the underlying physiological processes that are essential for maintaining homeostasis. In the first part of this course, students will learn the organization of the human body and histology, and review basic biology and biochemistry (e.g. cells, cellular respiration, molecular bonding). Organ systems will be covered in depth, and extended into discussion of medical conditions and diseases. Systems to be covered will include the integumentary system, skeletal system, muscular system and nervous system. Laboratory experiments will involve measurement of oxygen consumption, membrane potentials, muscular movement and dissection of preserved organs and/or animals.

**BIO 391**  
**Anatomy and Physiology II**

0.625 Credit  
 Honors

*Prerequisite: one course each in biology and chemistry, anatomy and physiology I*

This course will be a continuation of Anatomy and Physiology I. This is designed for students interested in biomedical research or medical field. Students will apply material regarding connective tissue and histology to learning about various organs systems and the physiological processes that maintain homeostasis. Organ systems will be covered in depth, and extended into discussion of medical conditions and diseases. Systems to be covered will include the cardiovascular system, respiratory system, digestive system, urinary system, endocrine system, and lymphatic (immune) system. Laboratory experiments will involve osmoregulation (kidney function), blood pressure, electrocardiogram (EKG), blood circulation and dissection of preserved animals and/or organs. **NOTE: Students who are interested in enrolling in Anat/Phys II without Ant/Phys I may enroll on a case by case basis with the consent of the instructor.**

## ***CHEMISTRY***

**CHEM 201**  
**Foundations in Chemistry & Material Science**

1.25 Credit  
 Honors

*Prerequisites: Algebra II (may be taken concurrently)*

The Foundations in Chemistry course is designed to provide students with an understanding of general chemistry concepts and principles as well as an initial look at organic chemistry. Topics include atomic structure, periodicity and basic quantum mechanics, bonding theories

and molecular shapes, solutions, compositional and reaction stoichiometry, gas laws, energy relationships in reactions, acid-base and oxidation-reduction reactions, and basic organic chemistry. This course emphasizes theoretical and conceptual aspects of chemistry and includes inquiry-based laboratory activities. In addition, students are introduced and have the opportunity to use state of the art instrumentation. Special attention is placed on how the bonding and molecular structures impact the properties of different materials and the application of these materials to different engineering applications.

### **CHEM 301**

#### **Chemical Structures and Interactions**

1.25 Credit  
College Prep

*Prerequisites: Algebra II (may be taken concurrently)*

The focus of this course is to understand the qualitative and quantitative means used to describe matter and the changes it undergoes. Chemical principles such as states of matter, atomic structure, nomenclature, stoichiometry, aqueous reactions, and bonding theory will be the focus. Additional topics may include: electron structure, thermochemistry, periodicity and acid-base theory. Inquiry-based laboratory activities will be conducted and will involve the use of the state-of-the-art instrumentation available.

### **CHEM 322**

#### **AP Chemistry**

1.25 Credit  
Advanced Placement

*Prerequisites: Algebra II, 1 year of general or honors chemistry*

The first semester of this course will focus on atomic structure, stoichiometry, aqueous reactions and solution stoichiometry, electronic structure and quantum theory, periodic relationships, bonding theory, molecular geometry and gas laws. (During the first semester only, students must be free either during gamma block OR the delta block, as extra class sessions meet during those times every week.) The second semester will focus on intermolecular forces, properties of solutions, kinetics, equilibrium, acids and bases, thermodynamics, electrochemistry and nuclear chemistry. Much of the course will be inquiry-based laboratory experiences that are designed to enhance the understanding of the core topics and prepare students to take the AP exam. **Student should expect to cover additional topics on their own time in preparation for the AP Chemistry Exam.**

## **COMPUTER SCIENCE**

### **CS 311**

#### **Introduction to Computer Science**

0.625 Credit  
Honors

*Prerequisites: Algebra II or equivalent*

Entry-level computer science course focused on the JAVA programming language. The course starts with an early introduction to objects and GUI. The course introduces basic data types, user-defined data types, control structures, simple data structures (arrays), and basic input and output (both console and graphical interfaces). Inquiry-based laboratory activities are used to enhance the understanding of core concepts.

**CS 312**  
**AP Computer Science**1.25 Credit  
Advanced Placement*Prerequisites: Algebra II or equivalent*

This course will cover the AP Computer Science curriculum. It is focused on the JAVA programming language. The course starts with an early introduction to objects and GUI. The course introduces basic data types, user-defined data types, control structures, and basic input and output (both console and graphical interfaces). The course will introduce the analysis and implementation of simple data structures (Arrays and ArrayLists), searching and sorting, recursion, inheritance and polymorphism. Inquiry-based laboratory activities are used to enhance the understanding of core concepts.

**CS 322**  
**AP Computer Science and Data Structures**1.25 Credit  
Advanced Placement*Prerequisite: Algebra II or equivalent*

This course will cover the AP Computer Science curriculum. It is focused on the JAVA programming language. The course starts with an early introduction to objects and GUI. The course introduces basic data types, user-defined data types, control structures, and basic input and output (both console and graphical interfaces). It emphasizes the organization of information; the implementation of common data structures such as lists, stacks, queues, trees, maps and sets; and the techniques of data abstraction (including encapsulation and inheritance). Searching, sorting and recursion will be explored. Students will be expected to apply theory, implement, and analyze algorithms and data structures. Inquiry-based laboratory activities are used to enhance the understanding of core concepts.

***EARTH, SPACE AND ENVIRONMENTAL SCIENCE*****ESCI 101**  
**Foundations in Earth/Space Science**1.25 Credit  
Honors

Foundations in Earth/Space Science is a course designed to develop a comprehensive understanding of the fundamental concepts and principles in the fields of geology, meteorology and oceanography. Students will explore the applications of physics, chemistry, environmental science and biology to each of these areas. Topics will include mineralogy, the carbon and nitrogen cycle, plate tectonics, volcanism/earthquakes, climatology, atmospheric thermodynamics, physical and chemical oceanography. The course will emphasize mathematical connections throughout. This course will have a strong laboratory base where students will learn the fundamentals of science instrumentation and research techniques. All students will be required to participate in research projects.

**ESCI 301**  
**River Ecology**

0.625 Credit  
Honors

*Prerequisite: General Earth Science, Biology and Chemistry*

This course is a student research based course; giving students the opportunity to design, perform, analyze and present both laboratory and field based environmental research. The course will emphasize water qualities where students will work in collaboration with the Department of Environmental Protection (DEP) in Connecticut. Students will use up-to-date field and lab equipment to monitor the biological physical and chemical aspects of the Trout Brook River. They will collect and analyze the data over the semester and complete a report for the DEP in Connecticut.

**ESCI 311**  
**Environmental Science**

0.625 Credit  
Honors

*Prerequisites: General Earth Science, Biology, and Chemistry*

This inquiry-based course will 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. Student research projects will be required to have a literature, laboratory and field research component. Through teamwork, students will use laboratory and field-based work to study and learn the content and skills needed to understand these interrelationships in the natural world.

**ESCI 321**  
**Advanced Astronomy A: Physical Astronomy**

0.625 Credit  
Honors

*Prerequisite: General Earth Science and algebra*

This course will combine laboratory work, research, and inquiry-based learning in order to examine the history of modern astronomy, how astronomers chart the sky, radiation, spectroscopy, today and future's telescopes. The course involves quantitative and qualitative aspects of astronomy and physics.

**ESCI 331**  
**Advanced Astronomy B: The Cosmos**

0.625 Credit  
Honors

*Prerequisite: General Earth Science and algebra*

This course will combine laboratory work, research, and inquiry-based learning in order to examine properties of stars and stellar evolution, the physical and chemical properties of our sun, red and blue giants, supernovae, galaxies, black holes, quasars, pulsars and other deep space objects and phenomena. The course involves quantitative and qualitative aspects of astronomy and physics. Astronomy B can be taken without having had Astronomy A.

**ESCI 341**  
**Geohazards**

0.625 Credit  
 Honors

*Prerequisites: General Earth Science, Biology, and Chemistry*

A course that explains and deals with the consequences of a natural hazard (e.g. volcanic eruption, earthquake, landslide or forest fire) which affect human activities. Human vulnerability, exacerbated by the lack of planning or appropriate emergency management, leads to financial, environmental or human losses. Long-lasting effects are linked to the resilience of the population. "Disasters occur when hazards meets vulnerability".

**ESCI 351**  
**The Geology of National Parks**

0.625 Credit  
 Honors

*Prerequisites: General Earth Science, Biology, and Chemistry*

There are many reasons that you should find this class appealing. You will gain an understanding of why landscapes and rocks in a given park are similar yet differ, why the preservation of geologic features within National Parks is important to appreciating natural science and how it relates to society and the environment. To understand how the spectacular scenery of our National Parks formed. You will have a better understanding of how the natural world around us works; i.e., why do earthquakes and volcanoes occur where they do? Why are there mountains on both coasts of the U.S., but not in the middle? Why are the western mountains so much higher than those in the east? The National Parks class will also help you to appreciate the delicate balance between nature and humankind. Every rock has a story to tell that every geologist must try to reveal.

The Badlands terrain is beautiful and desolate; fascinating, yet formidable. Early settlers avoided this land because it was poor for farming and a barrier to travel.

Yet, from this hostile terrain has come much of what we know about North America's "Golden Age of Mammals" in the Oligocene Epoch. The strange bones in the walls of the canyons and cliffs and along stream banks aroused the curiosity of nineteenth-century naturalists. As it turned out, this region was probably the richest storehouse of vertebrate fossils in all of North America.

**ESCI 361**  
**Meteorology**

0.625 Credit  
 Honors

*Prerequisites: General Earth Science, Biology, and Chemistry*

Have you wondered how the swirling atmospheric maps on TV spell out where a storm is going or how much snow is going to fall? Meteorology (Weather, Climate and the Atmosphere) affect our lives every day, from our normal daily activities to where we choose to go on vacation. Weather affects our economy, and even how we fight wars. This course focuses on introducing the student to basic concepts involved in the analysis of weather phenomena on a global and local scale. Major topics include heat balance, atmospheric stability, precipitation processes, cyclonic activity, severe weather, weather analysis, and weather forecasting techniques.

**ESCI 371**  
**Oceanography**

0.625 Credit  
Honors

*Prerequisites: General Earth Science, Biology, and Chemistry*

Oceanography is the branch of earth science that studies the ocean, covering a wide range of related topics including marine organisms and ecosystem dynamics; ocean currents, waves and geophysical fluid dynamics; plate tectonics and the geology of the seafloor; chemical fluxes and physical properties within the ocean and across its boundaries. These diverse topics reflect multiple disciplines which oceanographers blend to further knowledge of the World Ocean and understanding of the processes within it.

## ***Health and Personal Wellness***

**HPW 101**  
**Exercise and Personal Wellness 1**

0.5 Credit  
College Prep

*Prerequisite: None*

Physical education is a year long course that will go towards meeting the requirement needed for graduation. Through this course of study students will be empowered to make choices, meet challenges, and develop positive behaviors in fitness, wellness and movement activity for a lifetime. Topics that will be covered include: adventure education, lifetime activity, fitness and wellness, skill development, and rhythm, movement, and dance.

**HPW 111**  
**Wellness Seminar**

0.25 Credit  
College Prep

*Prerequisite: None*

Wellness seminar covers the following topics: diversity awareness; conflict resolution; career exploration; attitudes; bullying/cyberbullying; PSAT review; cooperative learning; high school success skills; study skills; organizational skills; values clarification; risk taking behavior; and personal safety.

**HPW 201**  
**Exercise and Personal Wellness 2**

0.5 Credit  
College Prep

*Prerequisite: None*

Physical education is a year long course that will go towards meeting the requirement needed for graduation. Through this course of study students will be empowered to make choices, meet challenges, and develop positive behaviors in fitness, wellness and movement activity for a lifetime. Topics that will be covered include: adventure education, lifetime activity, fitness and wellness, skill development, and rhythm, movement, and dance.

**HPW 201**  
**Health**

0.5 Credit  
 College Prep

*Prerequisite: None*

Health is a year long course which will meet the health requirement needed for graduation. Health is designed to enable students to be responsible, respectful, informed and capable when making decisions which would impact the well being of themselves and others. Topics that will be covered include: nutrition, diseases and disorders, mental and emotional health, drugs, alcohol, tobacco, growth and development, and healthy and safe relationships.

***INDEPENDENT STUDY & RESEARCH***

**RES 501**  
**Independent Study**

0.625 Credit  
 Honors

*Prerequisite: Approval of Director and Research Advisor*

The independent study program offers students the opportunity to work for one semester on a project that has been approved by their Independent Study Advisor. This is often a way students can gain the necessary background information and techniques to move onto an Honors in Research Project but may also be a self-contained exploration of an area of interest. All students in this program will be required to keep a Journal and Portfolio that shows the time, effort and products of the work involved in the project as well as produce a final product approved by their advisor.

**RES 502**  
**Honors in Research**

1.25 Credit  
 Advanced Placement Weighting

*Prerequisite: Approval of Director and Research Advisor*

Research conducted over a minimum of 2 semesters may be considered for honors research credit. This will require completion of a thesis, faculty committee approval of the work, and a final presentation to the afternoon session student body at the close of the school year. Opportunities of attendance to regional scientific symposiums are encouraged and supported by arrangement.

***INTERDISCIPLINARY SCIENCES***

**INS 301**  
**Forensic Science**

0.625 Credit  
 Honors

*Prerequisite: one course each in biology, chemistry and physics*

This course is an interdisciplinary course that applies the principles of physics, chemistry, molecular genetics and biology to forensic science and the law. Students will utilize advanced equipment in Instrumentation Lab in applying modern techniques of chemical analysis to forensic science. Students will work in teams and be expected to research various concepts and

apply them to the analysis of physical evidence. Students will produce evidence reports and be asked to defend and effectively communicate their findings. Topics will include: trace evidence; hair; fibers; DNA; immunology; serology; toxicology; drugs fingerprints; firearms; impressions; and document analysis.

**INS 311**

**Ethical Issues-Science, Technology, and Society**

0.625 Credit

Honors

This seminar course promotes students' understanding of the interrelated concerns of society and the sciences. Science and technology related issues will be examined in light of social and government-policy decisions stemming from those issues. Students will assess underlying scientific foundations and evaluate ethical, social, and political implications of various issues. A basic theme is the fact that on-going developments in science and technology continually present medicine, engineering, and society with new moral and legal challenges. Topics may include issues such as research programs involving human subjects and/or animals, start of life and end of life decisions, cloning, sponsored research, and intellectual property.

**INS 321**

**Interdisciplinary Science Seminar**

0.625 Credit

Honors

*Prerequisite: General Biology, Physics, Chemistry*

This course is intended for students who wish to extend their knowledge of special topics within Biology, Chemistry, Physics and Psychology with readings and discussions. Topics will vary and be determined by the interest of students and instructors.

**INS 401**

**Leadership in Science, Engineering, and Medicine**

0.625 Credit

Honors

Business enterprises specializing in the sciences, engineering, and medicine share similar processes and organizational structures to enable efficient, effective, and profitable operations. This survey course will expose students to the business and technical processes associated with each of the functional disciplines in these types of organizations. Industry leaders will present guest lectures that will supplement the regular class instruction schedule. Each topic will be viewed through the lens of the fundamental math, science, and leadership attributes that characterize the particular functional area. Topics will include: research, design & development, human resources, production, finance, marketing, ethics, information systems, and quality assurance.

## **LANGUAGE ARTS**

### **ENG 100/101**

#### **9<sup>th</sup> Grade English - American Literature**

1.25 Credit

College Prep/Honors

*Prerequisites: none*

Students enrolled in this course will study American Literature through a variety of themes. It will encourage the students to think critically about literature, connect to their personal experiences and make connections across disciplines. Students in American Literature will work closely with the American History curriculum as it compliments the content of the course. The American Literature course will also involve the students in a variety of writing experiences to demonstrate their knowledge of the content and their ability to develop their skills in this area. Technology will be integrated to enhance the students' knowledge of American Literature and culture.

### **ENG 200/201**

#### **10<sup>th</sup> Grade English - The Power of Voice**

1.25 Credit

College Prep/Honors

*Prerequisites: none*

The emergence of voice is integral in understanding the power, authority, and social advancements within societies. Power is gained, maintained, and often restricted through language and the expression of individual and collective voices. Along with the power of voice comes responsibility: the obligation to act justly and the spirit to better the world around. When used properly, strong voices have given rise to leadership, activism, empowerment, and liberation. Unfortunately, the responsibilities of voice are not always fulfilled. Often, voice and the associated power are corrupted, leading to oppression and injustice. In "The Power of Voice," students will study voices from around the globe and across America. Reading classical texts, modern works, current periodicals, and diverse genres will add to student knowledge of global voices. In addition, students will write and create their own works to help discover and develop their own voices and unleash the inherent power to better the world around them. The ultimate goal of the course is to heighten the students' understanding of the powers, dangers, and endless possibilities of voice.

### **ENG 300/301**

#### **11<sup>th</sup> Grade English - World Literature**

1.25 Credit

College Prep/Honors

*Prerequisites: none*

World Literature provides students with the opportunity to explore literature from many cultures within its historical context. The course will examine how cultural and literary archetypes exist in a multicultural and historical context. Students will learn how literature passes on cultural values and explains natural events. Students will continue to develop their effective communication skills in the areas of reading, writing, listening, speaking, and viewing. Technology will be integrated to enhance the students' knowledge of world literature and culture. This course will encourage the students to think critically about literature, make connections across disciplines, and connect to their personal experiences in order to succeed in their academic studies and their future careers. SAT Verbal skill practice will be integrated into the course.

**ENG 312**  
**11<sup>th</sup> Grade English – AP English Literature and Composition**

1.25 Credit  
Advanced Placement

*Prerequisites: none*

Advanced Placement English Literature and Composition engages students in the careful reading and critical analysis of imaginative literature. Through the close reading of selected texts, students deepen their understanding of the ways writers use language to provide both meaning and pleasure for their readers. As they read, students consider a work's structure, style and themes, as well as such smaller-scale elements as the use of figurative language, imagery, symbolism and tone. The course includes intensive study of representative works from various genres and periods, concentrating on works of recognized literary merit. The pieces chosen invite and reward rereading and do not, like ephemeral works in such popular genres as detective or romance fiction, yield all (or nearly all) of their pleasures of thought and feeling the first time through. The AP English Literature and Composition Development Committee agrees with Henry David Thoreau that it is wisest to read the best books first; the committee also believes that such reading should be accompanied by thoughtful discussion and writing about those books in the company of one's fellow students.

**ENG 400/401**  
**12<sup>th</sup> Grade English – Research and Writing**

0.625 Credit  
College Prep/Honors

*Prerequisites: none*

Research and Writing will be offered in the 2012-2013 school year.

**ENG 410/411**  
**12<sup>th</sup> Grade English – College and Creative Writing**

0.625 Credit  
College Prep/Honors

*Prerequisites: none*

College and Creative Writing will be offered in the 2012-2013 school year.

**ENG 422**  
**12<sup>th</sup> Grade English – AP English Language and Composition**

1.25 Credit  
Advanced Placement

*Prerequisites: none*

Advanced Placement English Language and Composition engages students in becoming skilled readers of prose written in a variety of rhetorical contexts, and in becoming skilled writers who compose for a variety of purposes. Both their writing and their reading should make students aware of the interactions among a writer's purposes, audience expectations, and subjects, as well as the way genre conventions and the resources of language contribute to effectiveness in writing. The overarching objective is to enable students to write effectively and confidently in their college courses across the curriculum and in their professional and personal lives. AP English Language and Composition provides students with opportunities to write about a variety of subjects from a variety of disciplines and to demonstrate an awareness of audience and purpose. It emphasizes the expository, analytical and argumentative writing that forms the

basis of academic and professional communication, as well as the personal and reflective writing that fosters the development of writing facility in any context. In addition, it teaches students that the expository, analytical and argumentative writing they must do in college is based on reading as well as on personal experience and observation. Therefore, it teaches students to read primary and secondary sources carefully, to synthesize material from these texts in their own compositions, and to cite sources using conventions recommended by professional organizations.

## ***MATHEMATICS***

### **MATH 111**

#### **Algebra I**

1.25 Credit  
Honors

*Prerequisite: Math Placement Test Score*

Based on a discovery approach (learn by doing), this course is designed so that students will discover important algebraic principles blended with geometry, data analysis, discrete mathematics and statistics. This investigative approach, driven by a strong emphasis on conceptual understanding and mathematical relationships, reflects national and state standards. Within the context of real-world data and cooperative learning groups, students will create an algebraic vocabulary; continue to develop oral and written expression; explore graphs and statistical methods to represent and interpret data; extend work with proportions and percents to rates and variation; graph and write linear equations; connect linear equations to parallel and perpendicular lines; solve systems of linear equations; investigate exponential growth and properties of exponents; describe functions and function notation; and model quadratics and find their roots. Active learning will be enhanced with technology-rich instruction including computer software applications, graphing calculator exploration and use of the Geometer's Sketchpad. A TI-83 or TI-84 graphing calculator is required.

### **MATH 120**

#### **Geometry**

1.25 Credit  
College Preparatory

*Prerequisite: Algebra I*

Based on a discovery approach (learn by doing), this course is designed so that students will acquire concepts visually, explore ideas analytically, and reason inductively and deductively. This investigative approach reflects national and state standards and supports ongoing preparations for CAPT and SAT. Within the context of real-world data and cooperative learning groups, students will create a common vocabulary using the building blocks of geometry; develop written mathematical representation; use a variety of tools for geometric constructions; discover properties and relationships of lines, angles, polygons and circles; apply formulas for area, surface area and volume; explore congruence and similarity; and apply the Pythagorean Theorem and basic right triangle trigonometry. Active learning will be enhanced with technology-rich instruction including computer software applications, graphing calculator exploration and use of the Geometer's Sketchpad. TI-83 or TI-84 graphing calculator is required.

**MATH 121**  
**Proof Based Geometry**

1.25 Credit  
Honors

*Prerequisites: Algebra I and Math Placement Test or Consent of Instructor*

MATH 121 emphasizes advanced geometry including axiomatic foundations of the deductive process. The course integrates different elements of three-dimensional figures and algebraic/graphical representation of geometric principles. Problem solving will include the use of graphing calculators. This course develops a structured mathematical system employing both deductive and inductive reasoning. It includes plane, coordinate, and transformational geometry. Proof is developed and the concepts of congruence and similarity are investigated and applied. Algebraic methods are employed to solve problems involving geometric principles. While Euclidian geometry is the basis of most of the course some non-Euclidian geometries are investigated. When appropriate, portions of MATH 121 will be applied to Foundations in Science courses.

**MATH 200**  
**Algebra II**

1.25 Credit  
College Preparatory

*Prerequisites: Algebra I and Geometry*

Algebra II is a course intended for students who possess a strong foundation in geometry and algebra. It is designed to challenge students and provide depth commonly found in collegiate level courses. Students will gain experience with algebraic equations and inequalities, functions (linear, polynomial, rational, irrational), graphs, systems of equations and inequalities, linear programming, matrices and determinants. The use of graphing calculators will be incorporated where appropriate.

**MATH 201**  
**Algebra II**

1.25 Credit  
Honors

*Prerequisites: Algebra I and Proof Based Geometry or Consent of Instructor*

Algebra II is a course intended for students who possess a strong foundation in geometry and algebra. It is designed to challenge students and provide depth commonly found in collegiate level courses. Students will gain experience with algebraic equations and inequalities, functions (linear, polynomial, rational, irrational), graphs, systems of equations and inequalities, linear programming, matrices and determinants. The use of graphing calculators will be incorporated where appropriate.

**MATH 300**  
**Pre-Calculus**

1.25 Credit  
College Preparatory

*Prerequisites: Algebra I, Geometry and Algebra II*

Pre-Calculus at the college preparatory level is a study of the Real number system, linear equations, graphical transformations, polynomials, functions (rational, power, and root), inverse functions in general with the exponential and logarithmic functions investigated in detail, trigonometric functions and trigonometric identities. Applications, common relationships, and graphing are stressed throughout the course topics. This course will give students both a detailed review of the algebraic foundation of mathematics and a preparation for further study of the mathematics necessary for additional scientific investigation and study.

**MATH 301**  
**Pre-Calculus**

1.25 Credit  
 Honors

*Prerequisites: Algebra I, Proof Based Geometry, and Algebra II (MATH 201 or equivalent)*

This course is a rigorous study of functions and their properties. Trigonometric, polynomial, rational, radical, and exponential mathematical functions are studied in detail as well as sequences and series, vectors, parametric, and polar coordinates. Development of integrated mathematical tools for applications to science will include more advanced levels of mathematical modeling. This course provides a strong foundation in functions and equations as they apply to both mathematical functions and models of science while preparing students to pursue calculus.

**MATH 302**  
**AP Statistics**

1.25 Credit  
 Advanced Placement

*Prerequisites: PreCalculus*

This course provides an in-depth study of applied statistics. The focus is on four major areas of statistical analysis:

1. Exploratory data analysis;
2. Planning a statistical study (including experimental design and sampling theory);
3. Probability modeling and simulation;
4. Statistical inference.

This course should be particularly valuable to students with interests in mathematics, engineering, life sciences, environmental science, and medicine. As part of the course work, each student will plan and conduct a substantial statistical study in an area of his or her interest. Students who successfully complete the course will be prepared to take the AP Statistics exam in May.

**MATH 412**  
**AB Level Calculus**

1.25 Credit  
 Advanced Placement

*Prerequisite: Pre-Calculus Honors (MATH 301 or Equivalent)*

This calculus course will provide students with all of the elements required for pursuing further collegiate study of calculus. The course is designed to prepare students for successful performance on the advanced placement exam at the AB level. Concepts presented will include use of graphical, numerical and symbolic representations and other materials usually required for the completion of at least one semester of college level calculus. Applications from biology, chemistry, physics as well as engineering are studied in the context of calculus. Technology is used where appropriate throughout the course. Students completing this course are prepared for successful completion of the calculus Advanced Placement exam (level AB).

**MATH 422**  
**BC Level Calculus**

1.25 Credit  
 Advanced Placement

*Prerequisites: Pre-Calculus Honors (MATH 301 or Equivalent) and Teacher Recommendation*

BC Calculus is designed for the most advanced mathematics students interested in pursuing more intense mathematics at the college level. All course topics completed in AB Calculus will be covered at an accelerated rate. In addition, the course will include topics from areas of

applied mathematics necessary to study concepts and principles underlying the physical sciences and engineering. Some of the advanced topics are polynomial approximations, infinite series, convergence and error bounds. Technology is used where appropriate throughout the course. Students completing BC Calculus are prepared for successful completion of the calculus Advanced Placement exam at the BC level.

**MATH 431**  
**Multivariable Calculus**

0.625 Credit  
Honors

*Prerequisites: AP Calculus (BC), Linear Algebra, and Consent of Instructor*

A college level introduction to multivariable calculus, topics covered include: vectors and vector functions; partial differentiation; multiple integrals; line integrals; surface area and volume; Green's theorem; Stoke's Theorem; the Divergence Theorem; and applications in the physical sciences and engineering. The MAPLE computer algebra system will be used throughout the course.

**MATH 441**  
**Intro to Differential Equations**

0.625 Credit  
Honors

*Prerequisites: AP Calculus (BC), Linear Algebra, and Consent of Instructor*

A college level introduction to differential equations, topics covered include: linear differential equations; equations of vibrational models; equations with variable coefficients; power series solutions and Bessel functions; Laplace transforms; systems of linear differential equations; numerical solutions; and applications in the physical sciences and engineering. The MAPLE computer algebra system will be used throughout the course.

**MATH 451**  
**Linear Algebra**

0.625 Credit  
Honors

*Prerequisites or Co-requisite: AP Calculus (BC)*

A college level introduction to linear algebra and matrix theory, topics covered include: vectors and vector geometry; linear systems; matrix operations and algorithms; eigenvalues and eigenvectors; orthogonality; and symmetric matrices and quadratic forms. The methods of linear algebra will be applied to problems in science, engineering, computer science, statistics, and other branches of mathematics. Linear algebra is sometimes called the "arithmetic of higher mathematics". It provides a solid foundation for advanced studies in mathematics, science, and engineering. Students planning to take Multivariable Calculus or Intro to Differential Equations in the senior year should take Linear Algebra concurrently with AP Calculus (BC).

**MATH 461**  
**Discrete Mathematics**

0.625 Credit  
Honors

*Prerequisite: Pre Calculus*

*Co-requisites: AP Calculus (AB or BC) and AP Computer Science*

A college level introduction to discrete mathematics as the mathematical foundation for computer science. The emphasis throughout the course will be on the connections between

logic, proof, and algorithmic thinking. Topics covered include: algorithms; sets, relations, and functions; integers and modular arithmetic; combinatorics; and graph theory. Depending on time and student interest, additional topics may be selected from: advanced graph algorithms; flows in networks; recurrence relations and generating functions; finite state machines and formal languages. Key data structures and algorithms will be studied in the JAVA programming language.

## ***PHYSICS***

### **PHYS 101**

#### **Foundations in Physics and Engineering**

1.25 Credit  
Honors

*Prerequisites: None*

Foundations in Physics is a course designed to develop a comprehensive understanding of the fundamental concepts and principles in the field of physics. Students will explore the theories and applications of topics such as motion, energy, waves, electricity, magnetism, and light. This course will stress the integration of physics into other scientific disciplines including earth/space science and chemistry. A strong connection to mathematics will be emphasized throughout the course. This course will have a strong laboratory base where students will learn the fundamentals of science instrumentation and research techniques. Engineering applications of physical principles are emphasized, including electrical circuits, motors, forces, energy, and photonics.

### **PHYS 301**

#### **Photonics**

0.625 Credit  
Honors

*Prerequisites: Introductory Physics*

Photonics is a laboratory course that starts with the basic principles of light, color, photometry, radiometry, and geometric optics. The course then proceeds into the theory, design and practical applications of fiber optics. After that the course explores advanced topics in light including wave optics, lasers, interferometry and holography.

### **PHYS 311**

#### **Robotics**

0.625 Credit  
Honors

*Prerequisites: Introductory Physics*

Robotics is a project based course that starts with the basics of electricity, mechanics and software design and then proceeds into the theory, practical use and application of microprocessors, sensors, interfaces and motor controllers in order to read sensors, light LEDs, display alphanumeric information, make music, control motors and interface with other devices. Students will devise and construct real functioning Robots and Robotic systems of their own design.

**PHYS 321**  
**Electronics**

0.625 Credit  
Honors

*Prerequisites: Introductory Physics*

Electronics is a project based course that starts with the basic concepts of electricity and advances into the theory, practical use and application of analog and digital solid-state components. Students will have hands-on experience using the latest electronic diagnostic equipment such as multimeters, function generators, digital logic probes and oscilloscopes. Students will also use a computerized CAD/CAM system to design and make printed circuit boards for their own projects.

**PHYS 331**  
**Materials Science and Engineering**

0.625 Credit  
Honors

*Prerequisites: Algebra II, Introductory Physics*

Materials Science and Engineering is a laboratory-based physics course that is an introduction to understanding the properties, structures and uses of engineering materials, including metals, ceramics, polymers and composites. The course is designed to teach the fundamental principles of material science so that the student can better understand material behavior and the impact of material selection and material performance on the performance of a structure or mechanism due to the relationship between macroscopic properties and microscopic causes.

**PHYS 341**  
**Fluids and Thermodynamics**

0.625 Credit  
Honors

*Prerequisites: Algebra II, Introductory Physics*

Fluids and thermodynamics is a laboratory-based physics course that extends basic fluid and thermodynamic concepts to more complex applications. This course, designed for students who already have taken introductory physics, will go into areas and depth not normally addressed in high school classes. Topics will include: kinetic molecular theory; laws of thermodynamics; heat transfer; heat engines; entropy; buoyancy; viscosity; laminar and turbulent flow; fluid friction; and piping system analysis.

**PHYS 351**  
**Nuclear Physics & Chemistry**

0.625 Credit  
Honors

*Prerequisites: Algebra II, Introductory Physics*

Nuclear science is a laboratory-based physics course that is an introduction to understanding the nucleus of the atom.

This course, designed for students who already have taken introductory physics, will go into areas and depth not normally addressed in high school classes.

Topics will include: radiation detection; nuclear stability; unstable nuclei and radioactive decay; environmental radiation; radiation absorption and interactions with matter; radiation biology; nuclear reactions; and nuclear power and energy.

**PHYS 402**  
**Classical Mechanics**

1.25 Credit  
 Advanced Placement

*Prerequisites: Concurrent Placement in Pre-Calculus or Calculus*

Classical Mechanics is a problem solving-based and laboratory intensive physics course that extends basic mechanics concepts to more complex applications. The curriculum follows the AP Physics C curriculum and includes an introduction to applied derivative and integral calculus. This course, designed for students who already have taken some introductory physics, will go into areas and depth not normally addressed in high school classes. Topics will include: motion in one and two dimensions; vectors; coordinate and velocity transformations; Newton's Laws; work and energy; conservation of energy and momentum; systems of particles; gravity and Kepler's laws; rotations; oscillations and waves.

**PHYS 412**  
**Electricity and Magnetism**

0.625 Credit  
 Advanced Placement

*Prerequisites: Introductory Physics; Concurrent Placement in Calculus*

Electricity and Magnetism is based on the AP curriculum that covers the range of topics from the theories of electromagnetic fields and potential to the explanations and practical applications of the phenomena of resistance, capacitance, impedance and electromagnetic induction.

## **SOCIAL STUDIES**

**SOC 100/101**  
**9<sup>TH</sup> Grade - United States History**

1.25 Credit  
 College Prep/Honors

*Prerequisites: none*

The American History is a course designed to take students on an exploratory journey of the history of North America. Students will investigate history in chronological order through various themes such as expansion, race relations, geography, government, education, immigration, arts & entertainment, transportation and economics. Students will have an opportunity to look at history from the vantage point of an everyday citizen as well as important historical figures and events. Students in American History will work closely with the American Literature curriculum as it compliments the content of the course.

**SOC 200/201**  
**10<sup>th</sup> Grade - Civics**

1.25 Credit  
 College Prep/Honors

*Prerequisites: none*

Civics is a required course for graduation. The focus of this course is to prepare students to participate in exercising their political responsibilities as thoughtful and informed citizens. Civics provides a basis for understanding the rights and responsibilities for being an American citizen and a framework for competent and responsible participation in American government. Emphasis is placed on the historical development of government and political systems, and the

importance of the rule of law; the United States Constitution; Federal, State and local government structure; and rights and responsibilities of citizenship. Students will actively investigate local, state and national issues, read and participate in discussions, and develop informed opinions using a variety of writing forms. This course prepares students to take the Connecticut Academic Performance Test (CAPT) by teaching key writing skills throughout the curriculum.

**SOC 300/301**  
**11<sup>th</sup> Grade - World History**

*1.25 Credit*  
*College Prep/Honors*

*Prerequisites: none*

This course examines all of world history from the Neolithic period to the modern period through chronological and thematic organization. Each period and region is examined through the five broad themes that inform the entire course - interaction between humans and the environment, development and interaction of cultures, state building, expansion and conflict, creation, expansion and interaction of economic systems and the development and transformation of social structures. The course examines emergence of agricultural societies, early civilizations, and the rise and fall of the classical civilizations. The major post-classical civilizations and medieval societies - Byzantium, the rise and spread of Islam, Medieval Europe, the Chinese reunification, the great kingdoms of Sahelian and sub-saharan Africa and pre-Columbian America are examined. Students explore the impact of the Columbian exchange and the global expansion of trade networks, Europeans, Africans, and Americans in the Atlantic world, continental empires and maritime states, the scientific revolution, the Enlightenment, revolutions in the Atlantic world, the rise of capitalism and the industrial revolution, free trade and the Opium War, colonization and imperialism, independence and Westernization, World War, Fascism and World War II, new states and a new world order, women in the world, and globalization and the new global age. Students will read primary and secondary source materials from a variety of materials and emphasis will be placed on historical writing in the form of essays, document based questions and a research project.

**SOC 302**  
**11<sup>th</sup> Grade - AP World History**

*1.25 Credit*  
*Advanced Placement*

*Prerequisites: none*

The purpose of the AP World History course is to develop greater understanding of the evolution of global processes and contacts in different types of human societies. This understanding is advanced through a combination of selective factual knowledge and appropriate analytical skills. The course highlights the nature of changes in global frameworks and their causes and consequences, as well as comparisons among major societies. It emphasizes relevant factual knowledge, leading interpretive issues, and skills in analyzing types of historical evidence. Periodization, explicitly discussed, forms an organizing principle to address change and continuity throughout the course. Specific themes provide further organization to the course, along with consistent attention to contacts among societies that form the core of world history as a field of study.

**SOC 400/401**  
**12<sup>th</sup> Grade - Sociology**

0.625 Credit  
College Prep/Honors

*Prerequisites: none*

Sociology is the systematic study of social behaviors and human groups. The course will examine the patterns of human behaviors by studying the primary institutions found in all human societies by identifying the membership groups various people belong to. The concepts of social norms, values, status, class ranking, racial, ethnic, gender, and religious elements will form the core basis of the course. The class will also explore the ever changing societal issues of crime, aging, poverty, deviant and anti-social group activities, urbanization, drugs, and alienation. It is the desire of the course to assist the student in developing problem solving skills and a rational approach to the world in which they inhabit.

**SOC 410/411**  
**12<sup>th</sup> Grade - Psychology**

0.625 Credit  
College Prep/Honors

*Prerequisites: none*

Psychology is a semester course that will scientifically examine the components and motivation of human behavior. Students enrolled in this course will learn more about themselves by being introduced to such topics as stress management, multiple intelligence and personalities, attitude formation, normative vs. abnormal behaviors, the dichotomy and debate between nature vs. nurture in human development, altered states of consciousness, cognitive reality, and the development of the person as a thinking, rational being. Students who elect this course should possess the following pre-requisites: mature listening and reading skills, the ability to engage in analytical study and debate, and the desire to conduct extensive research in topics chosen by the student and instructor.

**SOC 422**  
**12<sup>th</sup> Grade – AP United States History**

1.25 Credit  
Advanced Placement

*Prerequisites: none*

The AP U.S. History course is designed to provide students with the analytic skills and factual knowledge necessary to deal critically with the problems and materials in U.S. history. The program prepares students for intermediate and advanced college courses by making demands upon them equivalent to those made by full-year introductory college courses. Students should learn to assess historical materials—their relevance to a given interpretive problem, reliability, and importance—and to weigh the evidence and interpretations presented in historical scholarship. An AP U.S. History course should thus develop the skills necessary to arrive at conclusions on the basis of an informed judgment and to present reasons and evidence clearly and persuasively in essay format.

## **WORLD LANGUAGE**

### **LAT 100/101**

#### **Latin I**

1.25 Credit

College Prep/Honors

*Prerequisites: none*

This Latin course is designed to be an introductory course for students wishing to learn the fundamentals of the Latin language. Over the course of the year, we study various topics of the language including grammar, translation, and learn derivatives. In addition to the language aspect, students will learn and study cultural topics such as the journey of Aeneas, the kings and heroes of Rome, and mythology. This course is designed to teach students a new language, while also emphasizing aspects of the English language.

### **LAT 200/201**

#### **Latin II**

1.25 Credit

College Prep/Honors

*Prerequisites: Latin I*

This Latin course is a continuation of Latin I. Students will add to their already extensive knowledge of vocabulary and grammar. In this course, students will study more complex aspects of language such as indirect statement, subordinate clauses, and subjunctives. Students will continue with translations and derivatives over the course of the year. In addition to the language, students will also learn more Roman culture including the Roman Forum, the Roman baths, and the legacy of the Roman emperors.

### **LAT 301**

#### **Accelerated Latin I**

1.25 Credit

Honors

*Prerequisite: Junior or Senior Class Standing*

This course is designed for a Junior or Senior who has previous extensive study in a different foreign language. The course will cover in depth topics of the Latin language and culture. Students will learn fundamental grammatical skills such as the Active and Passive Voice of verbs in all six tenses, the six cases and five declensions of nouns and adjectives, the use of the relative pronoun, adjectives and adverbs, and participles. In addition to the extensive Latin grammar, students will be required to research, understand, and make modern connections to the story of Aeneas, Romulus and Remus, the Roman monarchy, internal and external conflicts in Rome, the Roman empire and the "Age of Augustus," architecture, and the Roman Forum. Students will be asked to translate passages that pertain to these topics to further enhance their understanding and knowledge base.

**SPAN 100/101**  
**Spanish I**1.25 Credit  
College Prep/Honors*Prerequisites: none*

Students enrolled in this beginning course of study participate in thematic units that promote effective communication and improved oral and written proficiencies through a variety of instructional strategies and authentic assessments. Students become effective communicators in the present tense through purposeful listening, speaking, reading, or writing activities. Students participate in authentic exchanges of information for a real purpose between people, such as discussing pastimes, personality traits, school life, ordering food in a restaurant, and stating the locations of people, places, and objects. Students experience the history, geography, and cultural perspectives of Spain, Central and South America.

**SPAN 200/201**  
**Spanish II**1.25 Credit  
College Prep/Honors*Prerequisites: Spanish I*

Students enrolled in this course of study continue to participate in thematic units that promote effective communication and improved oral and written proficiencies through a variety of instructional activities and authentic assessments. Students continue to build upon their effective communication skills through purposeful listening, speaking, reading and writing activities. Students participate in authentic exchanges of information for a real purpose between people, such as describing classroom objects, extracurricular activities, and special events, and inquiring and giving directions. Additional authentic thematic units include discussing emergencies and injuries. Students communicate in the past and present tenses, and they experience the history, geography, and cultural perspectives of Spain. Literature in the form of poetry, fables and short stories is introduced.

**SPAN 300/301**  
**Spanish III**1.25 Credit  
College Prep/Honors*Prerequisites: Spanish II*

The Spanish III course is designed to provide a review of the fundamentals covered in Spanish I and II followed by further development of their reading, writing, listening and speaking abilities through a variety of activities. Much of the class is conducted in Spanish and students are expected to take many risks with the language. The focus of the class shifts from vocabulary expansion and the basics of grammar to building a more in depth understanding of how these tools are used in everyday communication and actually putting them into practice in real life situations. Students are introduced to advanced aspects of the language such as command forms, distinguishing between the preterit and imperfect, the future tense and situational use of the subjunctive. Students are exposed to many of these aspects in Spanish I and II, however this course works to give students more practice using these skills in parallel with one another to produce fluid language. Students will practice and develop their skills by reading short stories, articles and dialogues; writing stories, compositions, and longer dialogues which employ learned grammatical concepts and vocabulary; reciting dialogues, speeches, stories, and poetry. They will continue to explore Spanish culture in an increasingly thoughtful

manner looking at the relationships of Spanish speaking countries with the United States as well as understand the history behind these relationships.

**SPAN 400/401**

**Spanish IV**

*1.25 Credit*

*College Prep/Honors*

*Prerequisites: Spanish III*

Spanish IV is for students who want to become proficient in the language. The class is taught exclusively in Spanish and participation is a necessity. The course will review tenses previously taught in levels 1-3: present, preterit, commands, imperfect, future, conditional and subjunctive. This class will deepen the understanding of all tenses as well expand higher level vocabulary needed to express thoughts, emotions and ideas in a meaningful manner. Students will speak exclusively in Spanish, review and refine grammatical skills in Spanish through reading and writing, read and discuss original work in Spanish (short stories, novels, newspapers, etc.) and continue to deepen the appreciation of the Spanish speaking culture and people outside of and within the United States.



## **Active Learning at The Academy**

Academy students are expected to be active participants in the learning process. Students and staff work together cooperatively to foster student growth and to help students progress towards becoming active learners. The components of being an active and life long learner are outlined below. Students will be given opportunities to develop these skills across the curriculum.

### **ATTITUDES AND BELIEFS**

- Is intrinsically motivated
- Takes risks
- Has a consistent work ethic
- Approaches learning as an ongoing process

### **SELF-KNOWLEDGE**

- Recognizes strengths and weaknesses
- Capitalizes on strengths
- Works to improve weaknesses
- Incorporates prior knowledge and experiences

### **PROBLEM SOLVING**

- Identifies the problem
- Collects and evaluates information
- Formulates and implements a plan of action
- Monitors progress and adjusts accordingly
- Analyzes results and draws conclusions
- Communicates conclusions effectively

### **MONITORING AND ADJUSTING**

- Perseveres
- Brainstorms creative solutions to find alternate paths
- Views a temporary setback as a doorway to new learning

### **COMMUNICATION**

- Uses appropriate terminology
- Makes information/ideas accessible to others
- Articulates proficiently

### **SOURCES**

- Seeks out variety
- Evaluates validity of each source using established criteria