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Active Learning at The Academy
Independent Study Request Form
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.

**Early College Experience (ECE):** UConn Early College Experience (ECE) is a concurrent enrollment program that allows motivated students to take UConn courses at their high schools for both high school and college credit. Every course taken through UConn ECE is equivalent to the same course at the University of Connecticut. Students benefit by taking college courses in a setting that is both familiar and conducive to learning. Our instructions have been certified through the University of Connecticut to serve as adjunct faculty members and teach UConn ECE courses.
Advanced Placement: Advanced Placement courses are designed to prepare students for the College Board AP exams in May. They are college level courses and the AP exam (for which an approximate $95 per test fee is charged) is required in order to gain AP credit. These courses are very rigorous and require a level of commitment and time that generally greatly exceeds that of College Preparatory or Honors classes.

Academic staff recommend student placement for the upcoming year based on a student’s record of work in current classes and on College Board testing. In the vast majority of cases students and parents are in agreement as to the best placement. On occasion, a family may insist on placement at a level above that which has been recommended for a particular course.

For all Honors and AP level courses at AAE student performance will be reviewed at progress report time at the end of the 1st Quarter, and the school reserves the right to change classes for a student who is not performing well or for whom placement is no longer appropriate.

All students at AAE who enroll in AP courses are required to take the AP exam in May as part of the coursework. At the time of enrollment, families are asked to submit an initial registration deposit of $25 for each AP course a child is enrolled in. Students who qualify for financial assistance can request a fee waiver from their school counselor.

If a student wishes to take more than three AP courses in an academic year, the request will be reviewed by the AP Coordinator and the student’s counselor.

Students interested in taking advanced placement exams may select the following courses.

**Science Courses**

AP Psychology
AP Biology
AP Chemistry

Physics: AP Physics 1
        AP Physics 2
        Classical Mechanics (AP Physics C)
        Electricity and Magnetism (AP Physics C)

**Mathematics Courses**

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

AP Computer Science
Principles

Humanities Courses
AP World History
AP United States History
AP English Language and Composition
AP English Literature and Composition

Visual Arts Courses
AP Studio Art
AP 2D Studio Art
AP 3D Studio Art

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 school counselor for course selection. Students should discuss course selection with their current math teacher for mathematics course selection. 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 11th grade students plan their two-year course sequence.

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, a Reading for Information test and a writing sample. 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 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 7.0 or more credits are promoted to the 10th grade.
- Students who have accrued 14.0 or more credits are promoted to the 11th grade.
- Students who have accrued 21.0 or more credits are promoted to the 12th grade.

**Minimum Graduation Requirements**

In order to graduate from the Academy of Aerospace and Engineering, a student must earn a minimum of 26.0 credits and must meet 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.

<table>
<thead>
<tr>
<th></th>
<th>State Requirement</th>
<th>Aerospace Requirement</th>
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<tbody>
<tr>
<td><strong>Cluster 1: Science, Technology, Engineering and Mathematics (STEM)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Math</td>
<td>3 Credits</td>
<td>4 Credits</td>
</tr>
<tr>
<td>Science</td>
<td>2 Credits</td>
<td>4 Credits (must include)</td>
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<tr>
<td></td>
<td>➔ 1 credit Physical Sci</td>
<td>➔ 1 credit Physical Sci</td>
</tr>
<tr>
<td></td>
<td>➔ 1 credit Biological Sci</td>
<td>➔ 1 credit Biological Sci</td>
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<tr>
<td>STEM Electives</td>
<td>None</td>
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<td></td>
<td></td>
<td>➔ 2 credits Engineering</td>
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**Cluster 2: Humanities**

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<tr>
<th></th>
<th>State Requirement</th>
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<tbody>
<tr>
<td>English</td>
<td>4 Credits</td>
<td>4 Credits</td>
</tr>
<tr>
<td>Social Studies</td>
<td>3 Credits (must include)</td>
<td>3 Credits (must include)</td>
</tr>
<tr>
<td></td>
<td>➔ 1 credit U.S. History</td>
<td>➔ 1 credit U.S. History</td>
</tr>
<tr>
<td></td>
<td>➔ .5 credit Civics/Gov’t</td>
<td>➔ .5 credit Civics/Gov’t</td>
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Cluster 3: Unified Arts

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<thead>
<tr>
<th></th>
<th>Credits</th>
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<tbody>
<tr>
<td>World Language</td>
<td>2</td>
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<tr>
<td>Art</td>
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Cluster 4: Career and Life Skills

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<tr>
<td>Physical Education/Health</td>
<td>1</td>
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<tr>
<td>Capstone</td>
<td>None</td>
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</table>

1.5 Credits

1. Credit P.E.
2. .5 Credit Health

Elective & Totals

<table>
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<th></th>
<th>Credits</th>
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<tr>
<td>Open Electives</td>
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<tr>
<td>Totals</td>
<td>20</td>
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</tbody>
</table>

26 Credits

Capstone Credit Requirement:

Successful student completion of Capstone is necessary for graduation from a CREC Magnet School. Students will receive 1 credit for completing the required outcomes outlined in the Capstone course. A grade of Pass with Distinction, Pass or Fail will be recorded on students’ high school transcript but will not count toward GPA.

Students will be guided through the course by their teacher who will provide consultation as they work through the completion of each step and outcome in the process. Along the way, teachers will also provide direct instruction that will help students with knowledge and skill acquisition to assist with the successful completion of each step and outcome. Teachers will score student classroom and independent work samples throughout the year to provide students with an understanding of their progress toward personal completion of the required Capstone outcomes. Due to the personalized and independent nature of the Capstone course, students will be expected to track their own progress toward successful completion of each Capstone outcome.
**Academy of Aerospace & Engineering**

**Curriculum Map**

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.

<table>
<thead>
<tr>
<th>Grade</th>
<th>PE/ Health</th>
<th>English</th>
<th>Social Studies</th>
<th>World Language</th>
<th>Math</th>
<th>Science</th>
<th>Math/Science</th>
<th>Unified Arts</th>
<th>Engineering</th>
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</thead>
<tbody>
<tr>
<td>9</td>
<td>Physical Education</td>
<td>American Literature</td>
<td>U.S. History</td>
<td>Spanish</td>
<td>Math</td>
<td>Integrated Physical Science</td>
<td>Foundations in Earth Science</td>
<td>AP Computer Science Principles</td>
<td>Intro to Engineering</td>
</tr>
<tr>
<td>11</td>
<td>PE Elective</td>
<td>World Literature or AP Language &amp; Composition</td>
<td>World History or AP World History</td>
<td>Spanish</td>
<td>Math</td>
<td>Science Elective</td>
<td>STEM Elective</td>
<td>Art Elective</td>
<td>Aerospace Fundamentals</td>
</tr>
<tr>
<td>12</td>
<td>PE Elective</td>
<td>College/Creative Writing or AP Literature &amp; Composition</td>
<td>Sociology or AP U.S. History</td>
<td>Spanish or Humanities Elective</td>
<td>Math</td>
<td>Science Elective</td>
<td>STEM Elective</td>
<td>Art Elective</td>
<td>Capstone</td>
</tr>
</tbody>
</table>
**College Planning**

Admission requirements for colleges vary greatly, but general guidelines like those below can be very helpful for students planning their high school program. Be sure to consult with counselors on a regular basis and to read the college, university, and trade school catalogues to be sure that you are taking the number and types of courses that will meet their specific requirements for admission. Below are some general requirements for types of colleges based on selectivity.

**Most Selective Colleges** • English—4 credits • Mathematics—4 credits • Science—3 credits • Social Studies—3 credits • World Language—3 to 4 years of the same language • Fine Arts—Recommended • Extracurricular activities that indicate leadership and initiative • Top 10-20% of the class • SAT I scores in the 655 to 800 range on each test (verbal/math/writing) • ACT minimum score of 29 • GPA A to B+ • Computer Competency

**Highly Competitive Colleges** • English—4 credits • Mathematics—3 or 4 credits • Science—3 credits • Social Studies—3 credits • World Language—3 years of the same language • Fine Arts—Recommended • Extracurricular activities that indicate leadership and initiative • Top 20-35% of the class • SAT I scores in the 620 to 654 range on each test (verbal/math/writing) • ACT minimum score of 27 to 28 • GPA B+ to B • Computer Competency

**Very Competitive Colleges** • English—4 credits • Mathematics—3 credits • Science—2 credits • Social Studies—2 credits • World Language—3 years of the same language • Fine Arts—Recommended • Extracurricular activities that indicate leadership and initiative • Top 35-50% of the class • SAT I scores in the 573 to 619 range on each test (verbal/math/writing) • ACT minimum score of 24 to 26 • GPA B to B- • Computer Competency

**Competitive Colleges** • English—4 credits • Mathematics—3 credits • Science—2 credits • Social Studies—2 credits • World Language—2 years of the same language • Fine Arts—Recommended • Extracurricular activities that indicate leadership and initiative • Top 50-65% of the class • SAT I scores in the 500 to 572 range on each test (verbal/math/writing) • ACT minimum score of 21 to 23 • GPA B- to C+ • Computer Competency
New Admission Requirements for the Connecticut State Universities

The Connecticut state universities have adopted new minimum standards for admission beginning with the incoming freshmen of 2015 at Central, Eastern, Southern and Western. These standards reflect the requirements of today's competitive global economy, the societal and workplace needs for critical thinking skills and core competencies, and the increased role of technological know-how in all aspects of life. By raising the bar on requirements for admission to the four state universities, the universities are committed to supporting a quality education for all Connecticut students. The new standards are consistent with the state's revised requirements for high school graduation, as approved by the state legislature and State Board of Education.

The new requirements for admission to the four Connecticut state universities include:

- 4 years of English including composition
- 4 years of Mathematics including Algebra I, Geometry and Algebra 2 and a fourth year in an algebra-intensive course such as trigonometry or statistics and probability
- 3 years of Science including at least one year in a life science and one year in a physical science, with two laboratory courses recommended
- 1 year elective course in one of the STEM (science, technology, engineering and mathematics) subjects
- 3 years of Social Studies including at least one year in U.S. History and the equivalent of one-half year in Civics and American Government
- 2 years of World Languages required, 3 years recommended (may be met by demonstrating competency at the second-course level)
- 1 year in a Humanities elective subject
- 1 year of coursework in the Arts
Course Descriptions

Cluster 1: Science, Technology, Engineering and Math (STEM)

BIOLOGY

BIO 201 (SC3132) Foundations in Biology

1 Credit
Honors

Prerequisite: None
Foundations in Biology & Health in the 21st Century is a course designed to develop a comprehensive understanding of the fundamental concepts and principles in the biological sciences while extending student understanding of the biomedical research field. Through the lens of a biomedical scientist, students will explore topics at the molecular, cellular, systemic and organismal levels. Topics include, but are not limited to, the origin of life, cellular physiology, cellular interaction and organ system physiology, molecular and evolutionary genetics, organismal interactions and environmental biology. Students will routinely utilize and develop laboratory investigations to explore biological and biomedical concepts. Students will also learn to critically evaluate scientific information from a variety of sources including information in print and electronic media. Further, class content is integrated with the Engineering Concepts in Chemistry course when exploring the
fundamentals of chemistry and biochemistry. Health in the 21st Century is interwoven throughout the Biology & Biomedical sciences curriculum.

**BIO 301 (SC3294) Molecular and Cellular Biology**

Prerequisite: General Biology
Fulfills Capstone graduation requirement.**
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. Students will develop individual or group projects based on personal interests within an area of Molecular and Cellular Biology. Students are expected to develop projects that allow them to participate in the Connecticut Science Fair and will complete a literature review and final research paper in the format of science research journal articles along with a powerpoint presentation.

**BIO 302 (SC3133) Advanced Placement Biology**

Prerequisite: Honors Biology (Recommended grade of B- or better)
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 321 (SC3334) Molecular and Mendelian Genetics**

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 (SC3308) Biodiversity  
0.5 Credit  
Honors

Prerequisite: General Biology
Offered only 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 (SC3307) Evolutionary Biology  
0.5 Credit  
Honors

Prerequisite: General Biology
Offered only 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 (SC3364) Human Evolution  
0.5 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 (SC3414) Evolution and Medicine  
0.5 Credit  
Honors

Prerequisite: General Biology
The goal of the growing field of Darwinian Medicine is to improve health practices and interventions by taking our evolutionary past into account. In this course students will develop a framework for understanding human health and disease from both an individual and public health perspective. Students will read from the current primary literature and will develop projects based on their specific areas of interest.
BIO 371 (SC3604) Biotechnology and Bioengineering

Prerequisite: General Biology and General Chemistry

This course will introduce students to the theoretical aspects of Biotechnology & Bioengineering and societal issues arising from this 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 (SC3304A) Anatomy and Physiology I

Prerequisite: General Biology

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. Organ systems will be covered in depth, with the first semester focusing on the nervous, muscular, skeletal, and integumentary systems. Throughout the course, we will consider not only the normal structures and function of the body, but also what happens when the body’s normal mechanisms fail and disease results. Students will have in-depth discussions, diagnose case studies, and complete presentations on medical conditions and diseases. Laboratory experiments will include dissection of preserved organs and/or animals.

BIO 382 (SC3304B) Anatomy and Physiology II

Prerequisite: General Biology, Anatomy and Physiology I

This course will be a continuation of Anatomy and Physiology I. 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 semester of this course, students will learn the organization of the human body and histology and review basic biology and biochemistry. Organ systems will be covered in depth, with the first semester focusing on the nervous, muscular, skeletal, and integumentary systems. Systems to be covered in the second semester will include the cardiovascular system, respiratory system, digestive system, urinary system, endocrine system, and lymphatic (immune) system. Throughout the course, we will consider not only the normal structures and function of the body, but also what happens when the body’s normal mechanisms fail and disease results. Students will have in-depth discussions, diagnose case studies, and complete presentations on medical conditions and diseases. Laboratory experiments will involve osmoregulation (kidney function), blood pressure, electrocardiogram (EKG), blood circulation, and will also include dissection of preserved organs and/or animals.
BIO 384 (SC2302) Zoology

1 credit
Honors

Prerequisite: Biology H

Zoology is the scientific study of animals. As humans, we are intricately tied to animal life – we’ve depended on many of them for food, work, companionship, and other services throughout our evolution and history. This course provides a survey of invertebrates and vertebrates, as well as animal taxonomy. The focus of this course will include the classification, anatomy, physiology, ecology, and behavior of each of the major animal groups. Dissections, handling of specimens and field studies are required.

BIO 390 (SS4023) AP Psychology

1 Credit
Advanced Placement

Prerequisites: Biology or instructor permission

This course will cover the advanced placement curriculum in psychology. Students will learn about the history of psychology as a way to both explain the range of human behavior that is considered normal and to establish criteria for identifying that which is abnormal. Many approaches have come into fashion and faded away during this history and well learn about what influenced them and what benefits some of these approaches brought to the field. One of the most important advancements came when psychologists began to explore the methods being independently developed and employed by scientists studying behavior in animals. From this historical foundation, students will evaluate the modern study of behavior and mental processes in human beings and other animals and how this knowledge is applied in the various major subfields in psychology. Students will also learn about the ethics and methods psychologists use in their science and practice.

CHEMISTRY

CHEM 201 (SC3262) Engineering Concepts in Chemistry

1 Credit
Honors

Prerequisite/Co-requisite: Algebra II

Engineering Concepts in Chemistry is a course designed to develop an overall understanding of fundamental concepts in Chemistry with an emphasis on engineering principles. In this innovative course; students will explore a foundations Chemistry curriculum with real-world applications from the engineering world provided throughout the course. Students will use qualitative and quantitative means to describe matter and the changes it undergoes. Chemical principals such as states of matter, atomic structure, electron structure, periodicity, nomenclature, stoichiometry, aqueous reactions, and bonding theory will be explored. Additional topics may include thermochemistry and acid-base theory. Inquiry-based laboratory activities involving state-of-the-art technology and equipment will be included with all units of study. Students will approach labs and projects using both the scientific method and engineering process (used at our partner aerospace companies) which includes the engineering action principles, 5 Whys Analysis and mistake-proofing. Students will learn how the scientific method and design process are related, what scientists and engineers do, and how careers in these fields benefit society.
**CHEM 301 (SC3454) Chemical Structures and Interactions**

1 Credit
College Prep

Prerequisite/Co-requisite: Geometry
The focus of this course is to understand the qualitative and quantitative means used to describe matter and the changes it undergoes. Chemical principles including; states of matter, physical and chemical changes, atomic structure, nomenclature, chemical reactions, and bonding theory will be the focus. Additional topics may include: compositional stoichiometry, electron structure, and periodicity. Inquiry-based laboratory activities involving state-of-the-art technology and equipment will be included with all units of study.

**CHEM 322 (SC3263) Advanced Placement Chemistry**

1 Credit
Advanced Placement

Prerequisites: Honors Chemistry (Recommended grade of B- or better)
Honors Algebra II (Recommended grade of B- or better)
The AP chemistry course is equivalent to a first-year college introductory course in chemistry and provides students with a foundation to support future advanced work in chemistry. In addition, the course is designed to prepare students to take the AP chemistry exam in May. Through inquiry-based learning (with significant time devoted to laboratory experimentation), students develop critical thinking and reasoning skills. Students cultivate their understanding of chemistry and science practices as they explore the following topics: compositional and reaction stoichiometry, atomic structure, electron bonding, molecular geometry, chemical reactions (including those in solutions), kinetics, equilibrium, thermodynamics and electrochemistry. AP chemistry covers many of the same topics covered in an honors chemistry course; but at a much greater depth with a focus on the interconnectedness of the topics. Students must complete a summer assignment (primarily review of first year topics) before school starts in the fall. In addition, students will be expected to cover additional topics on their own time during the school year in preparation for the AP chemistry exam in May.

**NOTE:** Students who take AP chemistry will be required to take an additional half year lab period in order to complete the extensive lab work required for the course.

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**EARTH, SPACE AND ENVIRONMENTAL SCIENCE**

**ESCI 101 (SC3024) Foundations in Earth Science**

0.5 Credit
Honors

Prerequisites: None
Foundations in Earth Science is designed to provide students with a comprehensive understanding of the fundamentals of Earth’s dynamic processes and the relationship of the Earth with the human population. Students will explore the topics of planetary evolution; rocks and minerals; plate tectonics; earthquakes; and volcanoes; internal and external forces and how they shape and change the Earth; the carbon, nitrogen, and water cycles; and how humans interact with, are affected by, and how they influence Earth’s processes. This course also provides students with a brief introduction to the fields of meteorology, environmental science, astronomy, geology, and oceanography.
ESCI 301 (SC3504) River Ecology

Prerequisites: General Earth Science, General Biology
Co-requisite: General 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. Students will collect and analyze the data over the semester and complete a report for the DEP in Connecticut.

ESCI 311 (SC3514) Environmental Science

Prerequisites: General Earth Science, General Biology
Co-requisite: General 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 (SC3344) Advanced Astronomy A: Cosmology and Planetary Science

Prerequisite: Foundations in Earth Science and Algebra II
Explore the history of the universe and what makes it function. This course will provide an overview of the field of cosmology: the study of Cosmic Microwave Background radiation, galaxies, other related phenomena, the history of the universe, and a study of planetary sciences, where we'll take a look at the planetary formations and properties of planets in our solar system. Part of the course will involve research on current explorations and studies of extrasolar planets and development on research in understanding the depths of our universe.

ESCI 331 (SC3354) Advanced Astronomy B: Astrophysics and Stellar Evolution

Prerequisite: Foundations in Earth Science and Algebra II
This course will provide a broad introduction to the field of astrophysics and the study of stars and interstellar medium, how stars evolve and change with time, and how we study the cosmos. Topics will include: history and development of the field of astronomy, star formation, stellar evolution, supernovae, neutron stars, black holes, and spectroscopy. Students will participate in multiple research opportunities for exploring current research into the field and studying
telescopes and the tools used for exploration and current missions. Astronomy B can be taken without having taken Astronomy A.

ESCI 341 (SC3284) Geohazards

0.5 Credit Honors

Prerequisite: Foundations in Earth Science
This course discusses the mechanisms and causes of natural hazards (ex, volcanoes, earthquakes, hurricanes, landslides, etc.) and their effects on the environment and human populations. An exploration on a population’s preparation, handling, and recovery in response to specific hazards will be conducted throughout the course to allow for a greater understanding of what defines a disaster and catastrophe and how populations and cultures have evolved as a result of these disasters. “Disasters occur when hazards meet vulnerability.”

ESCI 361 (SC3394) Meteorology

0.5 Credit Honors

Prerequisite: Foundations in Earth Science
Have you ever wondered how the meteorologists on TV read the information on weather maps or can tell you what the next week's weather is going to be like? Curious about why storms occur, why it rains, or how certain clouds in the sky form? Meteorology (weather, climate, and atmosphere) affects our daily lives, from normal activities to planning ahead for a trip. It affects a location’s economy and how we can function as a society. This course is an introduction to the basic concepts behind the science of how the weather works, including analysis of weather phenomena, heat balance, atmospheric stability, precipitation processes, circulation patterns, severe weather, weather analysis, and forecasting techniques.

ESCI 371 (SC3434) Oceanography

0.5 Credit Honors

Prerequisites: General Earth Science and General Biology
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.

ESCI ### (SC3012) Advanced Topics in Earth Science

1 Credit Honors

Prerequisite: Biology Honors, Earth Science honors
Prerequisites: General Earth Science or Teacher Approval
Fulfills Capstone graduation requirement**
Full year course that discusses the different professions and research being done in fields that fall under the category of Earth Science. This course will provide the opportunity to choose an Earth Science field of interest and design an independent research project along with an outline for learning about that specific field and research area. Students will have the opportunity to work with peers in the class or independently. The first semester will involve learning about the field; the second semester will involve
developing a project and presentation on a current research topic. There will be opportunities to reach out to professionals in the chosen field and to work with live data and information. Subject areas can be, but are not limited to: Meteorology, Climatology, Oceanography, Glaciology, Geology, Mineralogy, Volcanology, Seismology, Paleontology, Cartography, and Geophysics.

ESCI ### (SC2233) AP Environmental Science

1 Credit
Advanced Placement

Prerequisite: Biology Honors, Earth Science honors

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.

‘INTERDISCIPLINARY SCIENCES

INS 301 (SC3244) Forensic Science

0.5 Credit
Honors

Prerequisite: General Biology, General Chemistry and General Physics

This half-year elective course provides an introduction to the topics of criminology within the field of forensic science. Study includes the applications of concepts from the areas of Biology, Chemistry, Physics, Entomology, Earth Science, and Anatomy and Physiology to analyze and investigate evidence that may be discovered in a criminal investigation. Major topics include processing a crime scene, collecting and preserving evidence, identifying types of physical evidence, organic and inorganic analysis of evidence, hair, fibers, and paint, toxicology, arson and explosion investigations, serology, DNA, fingerprints, firearms, and document analysis. The main focus of this course will be to emphasize the evidential value of crime scene and related evidence and the services of what has become known as the crime laboratory. This course combines basic theory and real laboratory experiments, creating an experiment based situation for the better understanding of the students. The experiments used reinforce previously learned scientific principles rooted in Biology, Chemistry and Physics. Classroom activities include experiments, projects, case studies and the incorporation of technology.

INS 401 (SC3384) Leadership in Science, Engineering, and Medicine

0.5 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.
INS 321 (SC3003) Interdisciplinary Science Seminar 0.5 Credit Honors

Prerequisites: Physics, Chemistry and Biology
This course is intended for students who wish to extend their knowledge of special topics within Biology, Chemistry, Physics and Psychology with readings, discussions and projects. We will explore the Science of Superheroes.

PHYS

PHYS ### (SC1125) Physics of Light and Sound 0.5 Credit College Prep

Prerequisites: Algebra 2
The study of light and sound course will include the study of vision, light innature, the physics of photography, the study of hearing, musical sounds, and room acoustics. Students will study how light and sound waves are produced and move, study the physics involved in photographic digital technology, human hearing and electronic recordings. Projects may involve studying acoustics of lecture and musical halls, the generation of musical tones by common musical instruments, and the use of artificial light to control visual effects.

PHYS 311 (SC3404) Robotics 0.5 Credit Honors

Prerequisites: General 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 ### (SC1130) Advanced Aerospace Systems 0.5 Credit Honors

Prerequisites: Algebra II
Advanced Aerospace Systems is a project based course that begins with the basic principles of flight and advances into the disciplines of aerodynamics, propulsion, structures, stability and control, and performance. Through this course, students will learn the design and operation of important aerospace systems by means of problem solving, laboratory work, and design challenges. Students will apply concepts from classical mechanics, fluid dynamics, electronics, and robotics and utilize computer aided engineering and rapid prototyping techniques. Throughout this hands-on course, students will communicate their work with oral presentations and written technical reports.

PHYS 321 (SC3374) Digital Electronics 0.5 Credit Honors

Prerequisites: General Physics
Co-requisite: Algebra 2
Digital 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. In the first half of this course, the students will learn how digital components are combined to make computers and in the second half, they will actually use and program microcontrollers to read sensors, light LEDs, display alphanumeric information, make music, control motors and interface with other devices.

**PHYS 331 (SC3312) Materials Science and Engineering**

Prerequisites: Algebra II, General Physics, General Chemistry

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 351 (SC3324) Nuclear and Particle Physics**

Prerequisites: Algebra II, General Physics

Nuclear science is a 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; nuclear reactions; and nuclear power and energy. This course will also include a review of the latest advances in particle physics.

**PHYS 361 (SC3366) Engineering Mechanics**

Prerequisite: Algebra II, General Physics

Engineering Mechanics is the basis of all the mechanical engineering sciences: civil, materials, mechanical, aeronautical and aerospace. This full year course will utilize the "building blocks" of statics, dynamics, strength of materials, and fluid dynamics. The course is devoted to the solution of real world mechanics problems through the integrated application of mathematical, scientific, and engineering principles. Special emphasis is placed on the physical principles underlying modern engineering design. All students will perform in independent engineering research projects.

**PHYS ### (SC3524) Science of Alternative Energy Sources**

Prerequisites: General Physics, Algebra II
Through this course, students will explore the science behind alternative energy sources and their real world application. The course will examine the advantages and disadvantages of solar, wind, hydrogen fuel cell, nuclear, and hydropower. Energy sources will be evaluated using fundamental physics concepts such as mechanics, thermodynamics and electricity and magnetism. Throughout this course, students will communicate their work with oral presentations and written technical reports.

PHYS 371 (SC3365) Maritime Engineering

Prerequisites: None
Through this course, students will understand the design and operation of important maritime systems by means of problem solving, laboratory work, and design challenges. Strong emphasis will be placed on seagoing and submersible systems. The effects of significant physical concepts such as drag and buoyancy will be evaluated, drawing heavily from classical mechanics, fluid mechanics, thermodynamics, acoustics, and electronics. In the projects, students will effectively manage and control the relevant physical concepts as they design and construct real-world maritime systems. Throughout this hands-on course, students will communicate their work with oral presentations and written technical reports.

PHYS ### (SC1231) Advanced Placement Physics 1

Prerequisite: Algebra 2
AP Physics 1 is the equivalent to the first semester of a college introductory, algebra-based physics course. AP Physics 1 addresses the topics of kinematics; Newton’s Laws of motion; torque; rotational motion and angular momentum; gravitation and circular motion; work, energy, and power; linear momentum; oscillations, mechanical waves and sound; fluid mechanics and thermal physics; and an introduction to electrical circuits. This course includes a hands-on laboratory component comparable to a semester-long introductory college-level physics laboratory. Students ask questions, make observations and predictions, design experiments, analyze data, and construct arguments in a collaborative setting, where they direct and monitor their progress. Participation in the AP Physics 1 Advanced Placement Exam is an expectation for this full year course. Four transferable UCONN credits may be available for students who earn a grade of C or higher as part of the UCONN Early College Experience (ECE) Program (course number 1201Q).

**Please see your school counselor about information regarding Early College Experience (ECE) registration and fee details.

PHYS ### (SC2222) Advanced Placement Physics 2

Prerequisite: Algebra 2
An Algebra-based physics course which covers the topics typically taught in the second semester of an introductory, algebra-based college Physics course. Students explore principles of fluids, thermodynamics, electricity, magnetism, optics, and topics in modern physics. Twenty-five percent of instructional time is devoted to hands-on laboratory work with an emphasis on inquiry-based investigations. Investigations will require students to ask questions, make observations and predictions, design experiments, analyze data and construct arguments in a collaborative setting where they direct and monitor their progress. Four transferable UCONN credits may be available for students who earn a grade of C or higher as part of the UCONN Early College Experience (ECE) Program.
**Please see your school counselor about information regarding Early College Experience (ECE) registration and fee details.**

**PHYS 402 (SC3363) Advanced Placement**  
Physics: Classical Mechanics  
1 Credit  
Advanced Placement

Prerequisites: General Physics; Concurrent Placement in Calculus  
AP Physics C: Mechanics is a full year course equivalent to a one-semester, calculus-based, college-level physics course, especially appropriate for students planning to specialize or major in physical science or engineering. The course explores topics such as kinematics; Newton’s laws of motion; work, energy and power; systems of particles and linear momentum; circular motion and rotation; and oscillations and gravitation. Introductory differential and integral calculus is used throughout the course. This course includes a hands-on laboratory component comparable to a semester-long introductory college-level physics laboratory. Students ask questions, make observations and predictions, design experiments, analyze data, and construct arguments in a collaborative setting, where they direct and monitor their progress.

**PHYS 412 (SC3343) Advanced Placement C: Electricity and Magnetism**  
0.5 Credit  
Advanced Placement

Prerequisites: General Physics; Concurrent Placement in Calculus  
AP Physics C: Electricity and Magnetism is a half year course equivalent to a one-semester, calculus-based, college-level physics course, especially appropriate for students planning to specialize or major in physical science or engineering. The course explores topics such as electrostatics; conductors, capacitors, and dielectrics; electric circuits; magnetic fields; and electromagnetism. Introductory differential and integral calculus is used throughout the course. This course includes a hands-on laboratory component comparable to a semester-long introductory college-level physics laboratory. Students ask questions, make observations and predictions, design experiments, analyze data, and construct arguments in a collaborative setting, where they direct and monitor their progress.

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**Technology**

**COMPUTER SCIENCE**

**CS 301 (EG1005) Computer Aided Design (CAD) with Prototyping**  
0.5 Credit  
Honors

Prerequisites: Algebra II or equivalent  
In this Computer Aided Design course, students will learn the principles of designing devices and systems on the computer and then actually transforming those software simulations into real world three-dimensional objects. Every idea and product today starts as a CAD design and then evolves through multiple prototyping stages until the product is finalized. In this class, the students will create 3D CAD designs that they then transformed into actual three-dimensional objects using the school’s Rapid-Prototyping Printer. In addition students will learn how to design electronic circuits and create actual Printed Circuit Boards with the
The students will then populate the boards with components and solder them to complete a working product.

CS 312 (SC3373) Advanced Placement Computer Science A

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 ### (TE3001) AP Computer Science Principles

The AP Computer Science Principles course is designed to be equivalent to a first-semester introductory college computing course. In this course, students will develop computational thinking vital for success across all disciplines, such as using computational tools to analyze and study data and working with large data sets to analyze, visualize, and draw conclusions from trends. The course is unique in its focus on fostering student creativity. Students are encouraged to apply creative processes when developing computational artifacts and to think creatively while using computer software and other technology to explore questions that interest them. They will also develop effective communication and collaboration skills, working individually and collaboratively to solve problems, and discussing and writing about the importance of these problems and the impacts to their community, society, and the world.
**EG 100 (EG0905) Introduction to Engineering Design**

1 Credit
College Prep

Prerequisite: None

Introduction to Engineering Design is largely project-based course that provides students with an introduction to the field of product design and development. Students will learn how to use the CAD software Autodesk Inventor Professional. Through the year this course will cover the design process, sketching, geometric relationships, 3-D modeling of parts and assemblies, creating work drawings, and product marketing and manufacturing.

**EG 200 (EG1911) Principles of Engineering**

1 Credit
College Prep

Prerequisite: Introduction to Engineering

Principles Of Engineering (POE) is a high school-level survey course of engineering. The course exposes students to some of the major concepts that they will encounter in a post-secondary engineering course of study. Students have an opportunity to investigate engineering and high tech careers. POE gives students the opportunity to develop skills and understanding of course concepts through activity, project and problem-based (APPB) learning. Used in combination with a teaming approach, APPB learning challenges students to continually hone their interpersonal skills, creative abilities, and problem solving skills based upon engineering concepts. It also allows students to develop strategies to enable and direct their own learning, which is the ultimate goal of education. Principles Of Engineering is the second of two
foundation courses in the Project Lead The Way high school engineering program. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

**EG 300 (EG1101) Introduction to Engineering**

**Prerequisite:** Junior Standing

Students enrolled in this course will use the engineering design process to solve engineering-type problems over the course of the semester. Students will create and develop working prototypes in the fields of civil, mechanical, and “green” engineering as well as materials science and packaging engineering. While this is a very hands-on course, students are expected to be active learners and communicate their work through technical presentations, reports and posters.

**EG 3## (SC1135) Aerospace Engineering**

**Prerequisite:** Junior Standing

Aerospace Engineering is a project based course which introduces students to the fundamentals of atmospheric and space flight. Students in this course will learn the fundamental principles governing aerospace systems through a mixture of problem solving, laboratory work, and design challenges. Projects will require students to effectively manage the physical concepts at work as they complete design challenges ranging from the construction of various aircraft to planning cross country flights. Throughout this hands-on course, students will communicate their work with oral presentations and written technical reports.

**EG 320 (EG1202) Engineering Economics**

**Prerequisite:** Junior or Senior Standing, Algebra 2

This course will expose students to the economic concepts they will need to function successfully in careers as engineers and engineering managers. The essence of engineering is to not just make a product, but to make it at a cost that will enable a make in the marketplace possible. With that goal, this course will cover the ideas, concepts and strategies the students will need to do that in the future. Addressing some of the issues covered in the Microeconomics and Macroeconomics AP courses, the students will learn about supply and demand, production and costs, competition and profit, inflation, unemployment and stabilization policies and how they impact engineering and manufacturing processes. In addition, the course will deal with specific engineering and business related topics such as cash flow, present worth, depreciation, profit margins and pricing.
Initial Math Course Placement
Course placement for incoming students is based on placement testing. All incoming students are required to take a math placement 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.

MATH 100 (MA2011) 
Foundation in Algebra
1 Credit
College Preparatory

Prerequisite: Permission of Principal and Documented Need
This is a basic preparatory course for first year algebra, designed for students who have had difficulty in mathematics and are two or more years below grade level in mathematics. The approach of this course is more concrete than abstract and focuses on increasing the understanding of basic concepts, gaining fluency in handling mathematical symbolism, and increasing problem solving techniques. Successful completion will lead to placement in Algebra I.

MATH 111 (MA2011) Algebra I
1 Credit
College Preparatory

Prerequisite: Placement via the Math Placement Test
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 (MA2111) Geometry

Prerequisite: Algebra I or Consent of Administration
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 (MA2114) Geometry

Prerequisites: Algebra I and Math Placement Test or Consent of Administration
Proof Based Geometry 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 (MA2261) Algebra II

Prerequisites: Algebra I and Geometry
Building on the skills, concepts, and vocabulary of Algebra I, this course extends what has been previously learned and introduces students to more advanced topics in algebra. The course is designed to satisfy the Common Core State Standards and to prepare students to compete with peers nationally as well as globally. Students will gain experience with the concepts of functions and inverse functions and investigate polynomial functions, rational expressions and functions, trigonometric functions, exponential and logarithmic functions, and inferential statistics. Use of technology in working with different mathematical models of real world problems is employed to enhance the learning experience. Successful completion of this course provides a foundation for further study in Mathematics as well as providing prerequisite knowledge for courses in other disciplines.

MATH 201 (MA2204) Algebra II

Prerequisites: Algebra I and a grade of B or better in Proof Based Geometry or Consent of Administration

Building on the skills, concepts, and vocabulary of Algebra I, this course extends what has been previously learned and introduces students to more advanced topics in algebra. The course is designed to satisfy the Common Core State Standards and to prepare students to compete with peers nationally as well as globally. Students will gain experience with the concepts of functions and inverse functions and investigate polynomial functions, rational expressions and functions, trigonometric functions, exponential and logarithmic functions, and inferential statistics. Use of technology in working with different mathematical models of real world problems is employed to enhance the learning experience. Successful completion of this course provides a foundation for further study in Mathematics as well as providing prerequisite knowledge for courses in other disciplines.

MATH 300 (MA2301) Pre-Calculus

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 (MA2244) Pre-Calculus

Prerequisites: Algebra I, Proof Based Geometry, and a grade of B or better in Honors Algebra II 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 (MA2353) Advanced Placement Statistics

1 Credit
Prerequisites: PreCalculus or Algebra II Honors
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;
This course should be particularly valuable to students with interests in mathematics, engineering, life sciences, environmental science, and medicine. As part of the coursework, 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 331 (MA2003) Advanced Mathematical Decision Making
1 Credit
College Preparatory

Prerequisites: Algebra 2
AMDM is a course that allows students to use the algebra, geometry, trigonometry, and statistics they know in new ways. Students will explore a variety of global issues by applying a mathematical knowledge-base to generate possible solutions. This course will prepare students to use algebra, geometry, trigonometry, discrete mathematics, and technology to model real world phenomena and solve problems. A graphing calculator and a computer are required for this course.

MATH 341 (MA2350) Advanced Problem Solving 1
1 Credit
Honors

Prerequisite: Algebra II Honors
This course will focus on abstract reasoning and advanced problem solving techniques. Problems will be drawn from a variety of sources. They will include advanced topics from algebra, geometry, and theory of functions that are not usually covered in the standard curricula for these courses (e.g. the cubic and quartic formulas from algebra, Ceva’s Theorem from plane geometry). Using problem solving as a teaching tool, the course will also cover mathematical topics such as logic, number theory, combinatorics, and graph theory, which are not part of the secondary curricular course sequence.

MATH 342 (MA2351) Advanced Problem Solving 2
1 Credit
Honors

Prerequisite: Pre-Calculus Honors
Like Advanced Problem Solving 1, this course will focus on abstract reasoning and advanced problem solving techniques. Problems will be drawn from a variety of sources. The problem solving work in the areas of Algebra, Geometry, Number Theory, and Combinatorics that was
done in Advanced Problem Solving I will be further developed. Additional problem solving skills in areas such as f will be introduced.

**MATH 412 (MA2333) AB Level**
**Advanced Placement Calculus**

1 Credit
Advanced Placement

Prerequisite: A grade of B- or better in Honors Pre-Calculus and Teacher Recommendation. 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 (MA2343) BC Level**
**Advanced Placement Calculus**

1 Credit
Advanced Placement

Prerequisites: A grade of B or better in Honors Pre-Calculus 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 (MA2344) Multivariable Calculus**

1 Credit
Honors

Prerequisites: AP Calculus BC

This course will offer a college level introduction to multivariable mathematics in two major areas: linear algebra and multivariable calculus. Linear algebra topics include: linear systems, matrices; eigenvalues and eigenvectors; orthogonal matrices; symmetric matrices and quadratic forms. Multivariable Calculus topics include: vectors and vector functions; partial derivatives; multiple integrals; line integrals; Green's Theorem, Stokes Theorem, and the Divergence Theorem. The MAPLE computer algebra system will be used throughout the course.

**MATH 441 (MA2334) Intro to Differential Equations**

0.5 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 461 (MA2354) Discrete Mathematics**

**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.
Cluster 2: Humanities

Initial English and Social Studies 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 reading for information test and a writing sample. Humanities placement for current students will be based on the placement recommendation from the student’s current teacher.

ENG 100/101 (EN1001/EN1002)
9th Grade English - American Literature

1 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.
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.

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.

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 (EN 1311)
12th Grade English – College and Creative Writing

Prerequisites: none
This course is designed to assist students in the development of their creative, as well as their college writing abilities. By reading and discussing the work of selected authors, students will add to their knowledge of characterization, plot, setting and point of view. Students will apply this knowledge while experimenting with different writing genres and discovering their own unique writing styles. Students will also learn and practice college level writing skills, beginning with the college application essay in order to be better prepared for the rigors of college writing. An assortment of mini-lessons will be aimed at improving grammar and mechanics. An emphasis will be placed on peer-revision as students work together to hone both their creative and academic writing skills. In addition to completing numerous written assignments and individual portfolios, each student will contribute to a class anthology and be encouraged to prepare at least one piece for submission to a publishing outlet or writing contest.

ENG 410 (EN 1233)
11th Grade English – AP English Language and Composition

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.
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 complements the content of the course.
SOC 200/201 (SS4131/SS4102)
10th Grade - Civics

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 (SS4202)
11th Grade - World History

Prerequisites: none
The World History course is a year-long course with an emphasis on globally inclusive content and important historical themes and connections. The course traces modern world history from 600 C.E. to present and emphasizes an interdisciplinary approach including geography, economics, and civics. Students will develop a thorough understanding of the causes and effects of world events that have led to the creation of the current world’s political, economic and social climate. Students will engage in activities that promote the development of research, reading, writing, speaking, and listening skills as part of the inquiry cycle, including but not limited to: intensive reading (non-fiction and fiction, primary and secondary source materials), participation in Socratic seminars, writing document based essays and developing a culminating research paper.

SOC 302 (SS4203)
11th Grade – AP World History

Prerequisites: Junior standing or consent of instructor
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 (SS4231)
12th Grade - Sociology

1 Credit
College Prep

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 ### (SS###)
12th Grade - Sociology

1 Credit
Uconn ECE

Prerequisites: None
Sociology is the study of how individual people relate to the groups, institutions, and structures. By examining the relationships between individual people, social groups and the structures that they live in, students will be able to better understand their own social reality. Special emphasis will be on the definition, examination, and analysis of social problems in the contemporary United States of America and other countries around the world. Specific topics for the course include: modern society and its social organization, institutions, communities, groups, and social roles, the socialization of individuals, family, gender, race and ethnicity, religion, social class, crime and deviance, population, cities, political economy, and social change. As an ECE course this curriculum will provide an additional college-level experience with credit-earning opportunities. This will help prepare students as they transition to college, while also providing a challenging new course for students who have a greater interest in the subject matter.

SOC 410 (SS4353)
12th Grade – AP United States History

Advanced Placement
1 Credit

Prerequisites: Senior standing or consent of instructor
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.
Cluster 3: Unified Arts

WORLD LANGUAGE

SPAN 100 (SP5001)
Spanish I

1 Credit
College Prep

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 (SP5101)
Spanish II

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 (SP5201)
Spanish III

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 (SP5301)
Spanish IV

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.
SPAN 500 (SP5401)
Spanish V

1 Credit
Honors

Prerequisites: Spanish IV
Students enrolled in this advanced course of study will continue to participate in the thematic units that promote communication and improved oral and written proficiencies through a variety of instructional activities and authentic assessments. Students continue to refine their effective communication skills through powerful listening, speaking, reading and writing activities. Students participate in advanced, authentic exchanges of information for a real purpose between people, helping them to connect their learning to the community in which they live and to see the relationship between language, community, and career. Through selected literary pieces from various countries based on themes such as heroism, friendship, myths and humoristic perspectives, students augment and refine their proficient skills in vocabulary and grammatical accuracy as they communicate. Cultural perspectives from a variety of Spanish-speaking countries are thematically woven into the units of study. The course is conducted in Spanish.

Composición en español intermedia (ECE 3178)

.5 Credit
Honors

Migraciones: curso temático de conversación (ECE 3179)

.5 Credit
Honors

This course has two parts and follows the requirements of the University of Connecticut (ECE program.) The first half will be an intermediate college level course for composition in Spanish (course 3178 at UConn). Students will be exposed to a variety of written genres and will have to produce their own work in each genre. The second half will be an advanced conversation college course (3179 at UConn) in which students will express ideas in Spanish using literature and film to acquire a greater understanding of specific historical and cultural contexts.

*Note - this course is two courses in the Uconn ECE system but will be taught as a full year course at AAE.
Fine Art and Design
Pathways have been established to better prepare your journey through the Visual Art and Design courses.

AR6022 - Advanced Studio Art

Foundation Course

Advanced Studio is an Art immersion course focusing on drawing, painting, printmaking, and sculpting. The instructional goals of the Advanced Studio Art program are: Encourage creative as well as systematic investigation of formal and conceptual issues. Emphasize making art as an ongoing process that involves the student in informed and critical decision-making. Develop technical skills and familiarize students with the functions of the visual elements. Encourage students to become independent thinkers who will contribute inventively and critically to their culture through the making of art.
AR6072 - Designing Minds

**Foundation Course**

10-12th Grade Students

**College Prep .5 Credit**

Describing Minds challenges students to research, develop, and refine projects that combine meaning within image-making and typographic form. Typical formats include branding and logo development, posters, books, game design, architectural design, websites, and interactive design. Students learn to articulate a critical and theoretical perspective and develop graphic design skills, such as type design and traditional letterpress. Strong craft and presentation skills are emphasized throughout. Students achieve the highest level of design excellence through critiques and peer reviews. The ability to visualize ideas both rapidly and convincingly on any platform (analog or digital with the Adobe suite) begins with the development of strong hand-drawing skills. Topics covered include rapid visualization drawing, ideation, basic and advanced perspective, blocking out shapes, appropriate point of view, composition, tonal contrast, light and shadow, textures and details, and presentation. Students receive instruction in the use of assorted media, including pen, pencil, markers, pastels, paint, and a variety of drawing papers.

AR0307 - Industrial Design

**Prerequisite:** Designing Minds

11th & 12th Grade Level Students

**College Prep .5 Credit**

_This is a course that runs every other year on the even number starting year. (i.e. 2016-2017)_

This multidisciplinary field involves applying 2D and 3D fabrication processes to produce objects, commercial products, and systems that entertain, enable, and inspire, and transform the way people live. Today’s product designer is multifaceted, with the ability to create, integrate, and communicate ideas across product areas, such as furniture or shoe design, fashion accessories, home and office décor, consumer products, and packaging.

AR0306 - Paint, Materials, and Contingencies

**Prerequisite:** Foundation Course

11th & 12th Grade Level Students

**College Prep .5 Credit**

Hands-on investigation of technical and formal issues in painting, focusing on the development of technical abilities in collision with concepts and exploration of different methods of achieving visual “dexterity.” This painting course integrates intellectual and technical ability with historical, contemporary, and personal strategies. Emphasis is on the exposure to and analysis of contemporary painting through visual presentations, lectures, and the practical application of painting as a medium, both in technique and material.

AR0305 - Visual Thinking

**Prerequisite:** Advanced Studio

11th & 12th Grade Level Students

**College Prep .5 Credit**

Explore traditional and contemporary printmaking techniques for transferring images photographically to intaglio, lithograph and screenprint. This course encourages exploration of technical experimentation in using drawings, photographs and computer-generated visual information as components of a print. Furthermore, students master the darkroom and printmaking skills necessary to bring their ideas from conception to printed edition. As a result, each student completes a final portfolio of prints ranging from black-and-white etchings to four-color separation screenprints.
**TE3301 - Green Building Design**  
11th & 12th Grade Level Students  
Prerequisite: Designing Minds  
College Prep .5 Credit

*This is a course that runs every other year on the odd number starting year. (i.e. 2017-2018)*  
In this architectural design course, students will become familiar with the basic concepts of sustainable building by examining the concepts of green building. We will design, draw out, and create models of residential and public building while looking at specific characteristic like how to increase heating and cooling efficiency of a home while reducing dependency on nonrenewable sources of energy. New technologies for specific structures like the heat trapping characteristics of roofs and how the sun’s heat increases the urban “heat island” effect will be the focus of units like substantially heating of neighborhoods in the urban market.

**AR5311 - Seen World**  
11th & 12th Grade Level Students  
Prerequisite: Foundation Course  
College Prep .5 Credit

You will explore sculpture and contemporary art to create three-dimensional and time-based works of art. This very broad area allows students to explore the traditional forms of sculpture as well as the contemporary genres of installation, performance, and film making. Skills as diverse as metal, woodworking, mold making and casting, 3D printed sculptures, welding, and video and film production are covered as tools for creating exciting new forms of art making.

**AR6202 - The Fine Art of Photography**  
11th & 12th Grade Level Students  
Prerequisite: Foundation Course  
College Prep .5 Credit

In this course we will explore digital photography in relation to fine art. Students will be given assigned lectures and writings, semester project, will be asked to produce art work and will be asked to participate in class discussion to better understand the physical, conceptual and theoretical characteristics of the electronic media as it pertains to art and art making. Emphasis will be placed on the students' development of an understanding of the evolution of and the theory associated with art, photography and electronic imaging as well as art history in a way which will help them to produce expressive and thoughtful works of art.

**AR6021 - 3D Art**  
11th & 12th Grade Level Students  
Prerequisite: Foundation Course  
College Prep .5 Credit

This course will introduce basic three-dimensional processes and materials as well as develop the student's' ability to analyze form and space relationships. 3D design involves purposeful decision making about using the elements and principles of art in an integrative way. Students will demonstrate understanding of 3D design through any three-dimensional approach, including, but not limited to, figurative or nonfigurative sculpture, architectural models, metal work, wood work, glass work, installation, performance, assemblage and 3-D fabric/ fiber arts.
AR0304 - AP Studio Art

Prerequisite: Advanced Studio +1 & Recommendation of previous Art teacher is required

11th & 12th Grade Level Students
Advance Placement 1 Credit

In this drawing course, the objective is to develop an awareness and understanding of how to construct drawings based on observation. This kind of drawing is developed out of a process that involves learning to see. Learning to see requires patience, concentration and practice. You will gain an understanding of and awareness strategies such as perspective; composition, line weight, proportion and measurement are used in describing forms in space. In constructing drawings on observation emphasis is placed drawing exercises and assignments both in and outside of class. Still life objects and interior space are the standard subject matter.

AR6044 - AP 2D Studio Art

Prerequisite: Advanced Studio +1 & Recommendation of previous Art teacher is required

2D Studio Art is intended for highly motivated students who are seriously interested in the study of 2D art for college level credit. Students submit portfolios for evaluation at the end of the school year, using a national standard for performance. Students maintain a sketchbook, a journal, and participate in group and individual critiques. Three major concerns are addressed: quality in student's work; student's concentration on a particular visual interest or problem; and student's need for breadth in the formal, technical and expressive.

AR6045 - AP 3D Studio Art

Prerequisite: Designing Minds +1 & Recommendation of previous Art teacher is required

11th & 12th Grade Level Students
Advance Placement 1 Credit

The course will emphasize the making of 3D Design through additive, and subtractive processes as an ongoing endeavor, involving the student/artist/designer in informed, critical and creative decision making. The student will be encouraged to find their own voice working with various approaches figurative/non-figurative sculpture, ceramics, three-dimensional fiber arts, casting, assemblage and construction, rapid prototyping, architectural models among others. Many materials may be used or considered for use in 3D Design. The student could explore wire, clay, paper, paper clay, Styrofoam, foam core, wood, metal, found objects, plastics, wax, stone, earth, sticks, rope, fabric, burlap, threads, yarns, cottons, fibers and so forth. How to use materials and how to present his/her 3D Design pieces will be a decision for the artist/student as he/she demonstrates his/her understanding of the elements and principles of design.

MU1103 Music Technology

0.5 Credit
College Preparatory
This course will study the techniques of modern computer-based music. Topics will include drum machine and synthesizer sequencing, musical form, the design and creation of electronic instruments (incorporating techniques such as touch pads and sonar), film scoring, and the Foley effect. This course will take place during the first semester. This course is open to grades 11 and 12 with preference given to seniors.

**MU2103 Sound Reinforcement & Recording**

0.5 Credit  
College Preparatory

The Sound Reinforcement & Recording course is intended to give students a basic understanding of two major applications of technology in music: live sound reinforcement and analog and digital recording. Students will be able to design and implement amplification systems for live shows. Students will produce and record a short album. Units include the study of acoustics, the science of sound, microphones, audio effects, live sound reinforcement, and recording techniques. This course will take place during the second semester. This course is open to grades 11 and 12 with preference given to seniors.

**MUSI 1011: Fundamentals/Ear Training I ECE**

1 Credit  
Advanced Placement/ECE

Fundamentals/Ear Training I - Three credits. Basic skills in note reading, rhythm, meter, pitch symbols, scales, key-signatures, intervals, triads, sight-singing, and dictation. No previous training is required. Completion of at least one year of preparatory work in music courses at the high school level is recommended. This course is a full year course. This course is open to grades 11 and 12 with preference given to seniors.  
Three transferable UCONN credits may be available for students who earn a grade of C or higher as part of the UCONN Early College Experience (ECE) Program.  
**Please see your school counselor about information regarding Early College Experience (ECE) registration and fee details.**

**MU1822: Band**

1 Credit  
College Preparatory

This performance-based instrumental music group is for students interested in continuing to play a band instrument and perform in public. Students are required to purchase/rent an instrument. Students will participate in pep band and concert band performances. A wide variety of music for winds and percussion will be studied and performed throughout the year. Attending all full band performances is a course requirement.

**Cluster 4: Career and Life Skill**

HEALTH AND PERSONAL WELLNESS
HPW 100 (PE9001) Exercise and Personal Wellness  
1 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 210 (HE9211) 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.

HPW ### (PE3001) Obstacles and Adventure  
0.5 Credit  
College Prep  
Prerequisite: 11&12 grade  
Students who take this course will partake in adventures that generate excitement and motivation to be physically active for life. Activities will include obstacle courses, climbing walls, self-defense training, outdoor sports and fitness programs that support participation in these types of activities. Students will set personal best goals, improve their confidence in their physical abilities while contributing to a positive social experience.

LIFE SKILLS

LIFE 300 (BU9541) Personal Finance  
0.5 Credit  
College Prep  
Prerequisites: Junior or Senior standing  
Financial Literacy prepares students for successful management of their personal finances by helping them to make informed choices as consumers, producers, and citizens in a global society. The course will provide students with the knowledge, skills, attitudes, and behaviors associated with the management of family economics and financial education. Students will learn how to set long and short term personal and financial goals, create and work with a personal budget, identify how and when to use credit, save and invest and understand the basics of banking services. Other topics that will be examined include how to rent an apartment and purchase a car. The use of cooperative learning, writing and student presentations will be emphasized. The course will meet the Career and Life Skills requirement of Connecticut’s plan for Secondary School Reform.
LIFE 400 (CP4331) Capstone

1 Credit
College Prep

Prerequisites: Senior standing

The Capstone Project portion of this course is designed to be a cumulative experience of a student’s high school years that demonstrates in-depth learning in a variety of ways. Students have the opportunity to use their personal interests, abilities, skills and special talents to create and present authentic projects. These projects are research-based and offer students the chance to demonstrate their knowledge and understanding of their chosen topic and to demonstrate the essential skills for a student graduating from high school. The Capstone Project involves each student choosing a research topic and research question, writing a proposal, extensive research of chosen topic, designing and bringing the topic to fruition and publicly and formally presenting the findings to a panel of faculty, community members and students.
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
- Analyses 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
Independent Study Request Form
The CREC Academy of Aerospace and Engineering
The Greater Hartford Academy of Mathematics and Science

An independent study course is designed by the student to investigate an area or field of specialization not normally covered in the department’s regularly scheduled course offerings. Independent studies should not be undertaken solely because of difficulty fitting other classes into your schedule, nor because a course you wish to enroll in is full. If you are having trouble enrolling in a course, please see your counselor for assistance.

Instructions
- Make a research proposal to a faculty member with whom you would like to take the independent study course.
- You and the instructor should agree on course details, including the material to be covered; course format; sources to be used; and method of evaluation. Complete this proposal form with the assistance of your sponsoring instructor.
- Return the completed proposal form, with the instructor's signature, to the guidance department. Forms will then be submitted to the school principal for final approval.
- Once final approval has been obtained, you will be registered for the course. If your request is not approved, you will be notified as soon as possible.
- The approval process can take several days, so you are encouraged to plan your project well in advance of the registration period. The deadline for independent study applications is the completion of the second week of the semester for which you are applying.

I. Student Information:

Name__________________________________________

Telephone________________________________________ Email__________________________________________

School____________________________________________

I. Independent Study Information:
III. Independent Study Proposal (to be completed by student):
Use a separate sheet if necessary

1. Describe the content and overall objective of your project.

2. Why does this project need to be carried out as an independent study? Be sure to address the question of whether any courses offered at AAE/GHAMAS cover the same material.

3. List the primary materials to be used during this study. Be specific.

4. List the secondary materials to be used during this study.
IV. Independent Study Approval (to be completed by instructor):

To be approved, an independent study proposal should meet the following criteria:

- The proposed study will benefit the student's academic development
- The Academy does not offer courses in the proposed topic, or the course(s) offered are not advanced enough for the student's needs
- The proposal has been carefully planned and materials of appropriate quantity and quality have been selected for study
- The student has appropriate and sufficient background knowledge to complete the proposal successfully
- The proposed work is at least the equivalent of course work carrying the same number of credits
- The student and faculty member have agreed upon a schedule of reading, writing, and meetings
- The student and faculty member have agreed upon a reasonable method of evaluation

Date for submission of final paper/project: __________________________________________

_______________________________________  __________________________
Instructor signature                        Date
For departmental use:

Approved
Not Approved

_________________________________  __________________
Principal or Designee              Date

Comments: