



# **Alabama School of Mathematics and Science**

## **Course Catalog**

Revised: 8/2019

## **ASMS Mission Statement**

To provide academically motivated Alabama students with exceptional preparation in the fields of math and science, empowering them to improve their community, state, and nation.

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## **Faculty**

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Nasrullah Aziz, M.Sc., M.Phil., Mathematics Professor  
Derek Barry, M.A., History Associate Professor  
Sarah Brewer, M.S., Mathematics Professor  
Bill Brouillet, B.S., Physical Education Professor  
Daniel Commander, M.A., Communications Assistant Professor  
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Grey Gaillard, M.S., Computer Science Assistant Professor  
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Elisa Rambo, Ph.D., Chemistry Professor  
Alison Rellinger, M.S., Biology Assistant Professor  
Patricia Rosales, M.A., Foreign Languages Assistant Professor  
Brian Sayler, M.A., English Assistant Professor  
Karen Smith, Ph.D., English Assistant Professor

## **Adjunct Faculty**

Melissa Bates, M.A., Foreign Language Instructor  
Erin Boldon, B.A., Foreign Language Instructor  
Tim Grabill, M.M.E., Fine Arts Instructor

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## Introduction

The courses described in these pages are applicable to the 2016-2017 school year. They have been designed to offer academic depth and diversity of content to accommodate the intellectual interest of both our students and the ASMS faculty. While every attempt will be made to accommodate students' interests, the actual slate of offerings in any quarter will be dependent on available staffing and minimum course enrollments.

The objective of the curriculum is to offer each student a thorough grounding in mathematics, science, and the humanities, to develop the skills and knowledge needed for future leadership roles in research, business, industry, and government.

In addition to the regular course offerings, the Alabama School of Mathematics and Science offers study options and special programs in the form of Directed Reading and Directed Research under individual faculty mentors. There is also an opportunity for experimental and experiential learning in the form of selected Special Projects. These Special Project offerings change with each academic year.

The specific minimum graduation requirements are described within. Each student must be registered for a minimum of five academic courses per quarter, although overloads may be taken with the permission of the academic counselor. In addition, each student must enroll in and successfully complete a Special Project each year that he or she is in attendance at the school.

Placement tests are employed in a variety of disciplines, including mathematics, biology, chemistry, and foreign languages, in order to determine appropriate course assignments.

Grading follows a letter evaluation system:

A	100-90	Excellent and Passing
B	89-80	Good and Passing
C	79-70	Satisfactory and Passing
D	69-60	Below Average and Failing
F	59-0	Poor and Failing
P		Passing
S		Satisfactory (an interim grade)
I		Incomplete
WP		Withdraw Passing
WF		Withdraw Failing
AUD		Audit
R		Repeat

Credit is awarded for courses successfully completed with a grade of "A," "B," "C," or "P." For courses that extend over more than one quarter, credit is awarded at the end of the sequence and an "S" on a report indicates satisfactory progress is being made. Incompletes must be completed by midterm of the next quarter, or, in the case of spring quarter, by the last working day in June for juniors and sophomores.

## Graduation Requirements

Courses completed prior to 9<sup>th</sup> grade will not be counted toward ASMS graduation requirements with the exception of Algebra or Geometry taken in the 8<sup>th</sup> grade. All requirements are stated in Carnegie Units (CU's). Specific graduation requirements are given below. However, students are required to also take 5.0 CU of additional coursework in order to complete the graduation requirements.

**Biology:** 1.5 CU

**Chemistry:** 1.5 CU

**Computer Science:** 0.5 CU

**English:** 4.5 CU

**Fine Arts:** 0.5 CU

**Foreign Languages:** 2.0 CU

**History:** 4.0 CU

**Mathematics:** 4.0 CU

**Physical Education:** 0.5 CU per year of enrollment at ASMS

**Physics:** 1.5 CU

**Special Project:** 0.25 CU per year of enrollment at ASMS

**Student Orientation:** 0.25 CU

## Curriculum Summary

The following represents the standards that must be met in each student's studies at ASMS. While ASMS strives to provide a varied and individualized curriculum, only rare circumstances would allow for approval of any variation in the following requirements.

**Biology:** 1.5 CU graduation requirement. Minimum of 0.5 CU completed at ASMS.

- Students with no previous biology credit will take *Honors Biology I & II* followed by at least one 0.5 CU biology elective.
- For students entering with biology credit, a placement exam will be used to evaluate the appropriate starting level in the ASMS biology courses.

**Chemistry:** 1.5 CU graduation requirement.

- All students are required to complete either the entire *AP Chemistry* sequence, or *General Chemistry 1 & 2* followed by at least one 0.5 CU chemistry elective.
- Entering sophomores with no previous chemistry credit are required to take *Introductory Chemistry* before any other chemistry course.
- For students entering with chemistry credit, a placement exam will be used to evaluate the appropriate starting level in the ASMS chemistry courses. *Introductory Chemistry* carries general elective credit and does not satisfy the 1.5 CU chemistry requirement.

**Computer Science:** 0.5 CU graduation requirement.

- *Computer Science: Principles* must be completed at ASMS. This course is generally completed during the first year of enrollment at ASMS.

**English:** 4.5 CU graduation requirement. Minimum of 1.0 CU completed during each year of enrollment.

- Sophomores must take Sophomore English and American Literature I. Juniors take Speech Communications, and they must also take either the two courses in our regular track, American Literature II and an English elective, or the year-long AP track, which includes three terms of AP English Language and Composition. Seniors choose between the two courses in our regular track, British Literature I and II, or the year-long AP track, which includes three terms of AP English Literature and Composition.

**Fine Arts:** Minimum of 0.5 CU taken at ASMS.

- *Survey of Art* or *Survey of Music* must be completed during the senior year at ASMS. Entering sophomores must complete 0.5 CU of either art or music during the sophomore year as a general elective credit.

**Foreign Languages:** 2.0 CU graduation requirement. Continuous enrollment until graduation requirement is completed in the preferred sequence.

- All students must complete the intermediate level of a language with 1.0 CU completed at ASMS.
- For all entering students wishing to pursue a language for which they already have some credit, a language placement exam will be used to evaluate the appropriate starting level in the ASMS language sequence.

**History:** 4.0 CU graduation requirement. Minimum of 1.0 CU during each year of enrollment.

- *Advanced American Studies 1/2 and 2/2* or *AP U.S. History* must be completed at ASMS during the junior year. Credits must include 1.0 CU in Western Civilization (World or European History), 1.0 CU in U.S. History, 0.5 CU in Economics, and 0.5 CU in Government.
- Incoming sophomores are required to complete *Human Geography* and *an elective* during the sophomore year.

**Mathematics:** 4.0 CU graduation requirement. Continuous enrollment until graduation requirement is met.

- Credits must include *Trigonometry & Precalculus* and one 0.5 CU math course beyond *Precalculus*.
- For all entering students a math placement exam will be used to evaluate the appropriate starting level in the mathematics sequence. If Geometry has not been completed prior to entering ASMS, it should be completed during the first year at ASMS.

**Physical Education:** 0.5 CU per year of enrollment in physical education or varsity sports; 0.5 CU graduation requirement in health.

- All students are required to take *Health* unless the course has already been completed prior to entering ASMS. This course does not count as an elective.

**Physics:** 1.5 CU graduation requirement. Minimum of 0.5 CU taken at ASMS.

- All students are required to complete an entire physics sequence at ASMS unless credit for a previous physics course is accepted by ASMS.
- All students with no previous physics credit are required to take *Introduction to Physics* during the junior year. *Introduction to Physics* carries general elective credit and does not satisfy the 1.5 CU physics requirement.

**Special Project:** 0.25 CU per year of enrollment at ASMS is required.

**Student Orientation:** 0.25 CU must be completed during the first quarter of enrollment.

## Concentration

Concentrations in an academic area are awarded to students who complete three courses beyond the graduation requirement in a discipline. Each department is given the latitude of determining the courses that are appropriate for the concentration. Individual faculty members may recommend to the President/Director additional areas of concentration that they deem worthy of recognition.

Concentrations are designed to allow students to pursue an advanced plan of study primarily during their senior year; however, coursework may begin as early as the junior year. Students applying for a concentration must:

1. complete three (3) approved courses in the area of concentration (1.5 CU's),
2. complete all required courses approved for concentration with a grade of 'A' or 'B',
3. apply for no more than two (2) concentrations.

Students who successfully complete the above criteria are awarded a seal on their diploma signifying completion of the concentration. The final transcript will indicate the area(s) of concentration.

Course specific criteria are as follows:

### **Chemistry**

To be awarded a Concentration in Chemistry, the student must complete 3 elective courses, as listed in the course catalog, beyond the three term chemistry requirement. Directed readings and directed research projects may not be used to satisfy the Concentration requirement.

### **Computer Science**

A student must complete Advanced Placement Computer Science I, Advanced Placement Computer Science II, and Advanced Placement Computer Science III. The prerequisites for the Advanced Placement sequence are Java I, Java II, and Java III.

### **Fine Arts**



Students wishing to earn a concentration in music or concentration with distinction in music or the performing arts must meet with the head of the Music Department no later than the beginning of the Spring term of their Sophomore or Junior year to declare their interest and verify the required courses.

Concentrations in music may be earned through either an instrumental or vocal track. Students are required to take Music Survey their senior year and play or sing in an ASMS band or choral ensemble for three terms of their Sophomore (if applicable), Junior, and Senior years. Credits for two of the terms are required. Credit earned from the third term may be applied toward a maximum of .5 CU of the concentration. Additional courses required are two terms of Music Theory.

A concentration in Visual Art requires AP Art 1-3 AR331, 332, 333.

### **Foreign Languages**

Single Language Concentration (French, German, Latin, or Spanish) - 1.0 CU above the requirement in the single language, with an additional 0.5 CU in a course pre-approved by the respective instructors.

Foreign Language Concentration - 1.0 CU above the requirement in the first or a second language, with an additional 0.5 CU in a course pre-approved by the respective instructors.

Classics Concentration - Requirements must be met in a combination of history and Latin classes, with an additional 1.5 CU in history and/or Latin courses.

### **Mathematics**

For a Concentration, a student must complete three (3) courses (1.5 CU) beyond Differential Calculus, at least one of which must be from the Calculus sequence. The Calculus sequence includes Integral Calculus, BC Calculus, Multivariable Calculus, and Differential Equations. For both Concentration and Distinction, the following requirements and restrictions apply: all grades in all math courses must be B or higher, and overall math GPA must be 3.6 or higher; no course except for a Directed Reading may count more than once (0.5 CU max), and a Directed Reading may count no more than three times (0.75 CU max); Computer Science courses do not count toward a concentration or distinction in Mathematics.

## **Concentration with Distinction**

Students who complete a concentration have the option of taking three additional courses (1.5 CU's) of advanced study in the same area, which may or may not include independent study. The additional coursework must be approved by a faculty sponsor. By successfully completing these additional requirements with a 3.5 GPA, the student merits ***Distinction*** in an area, which will also appear on the diploma and transcript.

Course specific criteria are as follows:

## **Chemistry**

To be awarded a Distinction in Chemistry, the student may choose from one of three options. The student may complete 6 elective courses beyond the three term chemistry requirement, or complete 5 elective courses and one 0.5 credit DR, or complete 4 elective courses and two 0.5 credit DRs.

## **Computer Science**

A student must complete the requirements for a Concentration and take three Directed Reading courses in Computer Science. All grades in Computer Science courses must be B or higher.

## **Fine Arts**

A Concentration with Distinction in Vocal Music is earned by taking a third term of Music Theory, and two of the following: Theatre Arts I, Jazz and the American Musical Theatre, two terms of voice, or enrollment in a second choral ensemble.

A Concentration with Distinction in Instrumental Music is earned by taking a third term of Music Theory, Jazz and the American Musical Theatre, and two terms in a second band ensemble.

A Concentration with Distinction in the Performing Arts is designed for the student who wishes to pursue advanced study in music and theatre. After completing a concentration in either vocal or instrumental music, three of the following are required; Theatre Arts I, Theatre Arts II, Theatre Production, or the Theatre Tech Directed Research.

A distinction in Visual Art requires in addition to the AP Art sequence: Survey of Art, Graphic Design, and completion of the AP Exam.

## **Foreign Languages**

Single Language Distinction (French, German, Latin, or Spanish) - 2.5 CU above the requirement in a single language, with an additional 0.5 CU in a course pre-approved by the respective instructors.

Foreign Language Distinction - 2.5 CU above the requirement in the first or a second language must be met, with an additional 0.5 CU in a course pre-approved by the respective instructors.

Classics Distinction - Requirements must be met in a combination of history or Latin classes, with an additional 1.5 CU in history and/or Latin courses.

## **Mathematics**

For a Distinction, a student must complete six (6) courses (3 CU) beyond Differential Calculus, at least two of which must be from the Calculus sequence. The Calculus sequence includes Integral Calculus, BC Calculus, Multivariable Calculus, and Differential Equations. For both Concentration and Distinction, the following requirements and restrictions apply: all grades in all math courses must be B or higher, and overall math GPA must be 3.6 or higher; no course except for a Directed Reading may count

more than once (0.5 CU max), and a Directed Reading may count no more than three times (0.75 CU max); Computer Science courses do not count toward a concentration or distinction in Mathematics.

## Courses

### General Electives

#### **GE100 Introduction to Linguistics .5 CU**

This course is a one-term introduction to human language in general and gives an overview over most areas taught in college linguistics such as phonetics, phonology, morphology, discourse analysis, sociolinguistics, neurolinguistics and etymology. This course furthers self-awareness in English as well as a better understanding of the multi-layered interconnectedness of all languages. Coursework includes extensive use of a variety of online materials, including a school-owned website tailored entirely to this elective. Prerequisites: None.

#### **GE101 European and Scandinavian Studies .5 CU**

The contemporary focus of this course is on the evolving influence and identity of an interconnected Europe in terms of the EU and the Eurozone. The course further provides a background on particular European and Scandinavian politics, societies and cultures. This course is collaborative in nature and will allow for joint, as well as individual, project-based exploration. Coursework includes extensive use of a variety of online materials, including a school-owned website tailored entirely to this elective. This course may not be offered every year. Prerequisites: None.

#### **GE102 Introduction to Sociology .5 CU**

This will be an elective course that studies human society and social behavior. Positive human relationships are an essential part of a civilized society, and how we interact with each other is important so that we can find answers to questions and solve problems in our world. As has been said, "Sociology teaches us to look at life in a scientific, systematic way", and "the values, beliefs, lifestyles of those around us, as well as historic events help to mold us into unique individuals who have varied outlooks on social reality." Therefore, this course will deal with the social atmosphere that helps to make us who we are and how we behave. Introduction to Sociology will cover topics such as culture, violence, deviance, social control, socialization and personality, group behavior, social class, and social institutions. The key component of this course is to study ourselves and the society that influences our behavior.

**GE103**                      **ASMS Fellows Research Program**                      **.5 CU/quarter**

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Students will develop a plan of action to explore a problem in today's communities which allows for scientific discovery over the course of their Junior year. Successful completion will include a research paper, product, portfolio and presentation. Students will be able to demonstrate accumulated skills in time-management, research, problem-solving, human interaction, organization, public-speaking and self-sufficiency. Students must be enrolled for three terms to receive credit for this class. Students will receive a WF if they do not complete the entire sequence. .5 credits will be earned each term which will be awarded in full at the end of the third term.  
Requirement: Junior status, application process.

**GE107**                      **Mythology**                      **.5 CU**

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An introduction to world Mythology with emphases that can vary: Greek and Roman Myth, Egyptian, Hebrew, Hindu and Buddhist. Prerequisites: none.

**GE125**                      **Debate**                      **.5 CU**

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This course offers a survey of both competitive and informal debate formats, including the classic Lincoln-Douglas model. While the course will emphasize oral communication, students will be expected to write short essays, research papers, and briefs in preparation for the debates. Prerequisites: none.

**GE129**                      **Yearbook**                      **.5 CU**

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Yearbook teaches a variety of skills, including journalism, publishing, and photography. The end result is a yearbook that students will keep for years. Students plan, organize and design our yearbook, conducting interviews with faculty and fellow students and covering all aspects of school life in words and pictures. This elective is a two semester class.

**GE145**                      **Introduction to Meteorology**                      **.5 CU**

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This course focuses on introducing students to the basic concepts of meteorology, with an emphasis on developing an understanding of the physical processes that contribute to observable weather conditions. Major topics of study include the structure of the atmosphere, heat balance, meteorological measurements, atmospheric stability, atmospheric motion, and wind circulations on both the global and local scales. The analysis of U.S. Government weather charts is also introduced. Visits to the Coastal Weather Research Center at the University of South Alabama, the National Weather Service of Mobile, and/or a local news station may be arranged. Prerequisites: None

## **Biology**

### **BL101, 102                      Honors Biology 1/2 - 2/2                      .5 CU/quarter**

This course is a two-quarter sequence in honors high school biology, entailing broad introductory coverage of biology including molecular biology, cell biology, genetics, organismal biology, population biology, ecology, behavior, biodiversity, and evolution. Laboratories are designed to reinforce the concepts introduced in lecture. The course is intended to supply an introductory biology for students who have not yet had an opportunity to take biology in high school. Prerequisites: Placement in this course is determined by performance on the biology placement exam.

### **BL210                      Field Botany                      .5 CU**

This course emphasizes the evolution, taxonomy and identification of vascular plants. Plants are studied in the context of major biomes and major local habitats. Students are required to sight identify important plant species, families, and divisions and to understand the ecological dynamics in local plant communities. This course has a heavy field emphasis, with weekly field trips to collect and study plants. One or more weekend field trips may be required. Prerequisites: Honors Biology or equivalent.

### **BL220                      Ornithology                      .5 CU**

Ornithology is the study of birds. Students study the classification, anatomy, physiology, biogeography, population biology, and behavior of birds. The laboratories are bird watching trips that emphasize species recognition. Students regularly visit nearby localities for the observation of birds. One or more weekend field trips may be required. Prerequisites: Honors Biology or equivalent.

### **BL230                      Introduction to Microbiology                      .5 CU**

The course introduces students to the fundamental aspects of microbiology and the impact this diverse group of organisms has on the environment and humans. Topics include microbial diversity, cell structure/function, physiology, genetics, reproduction and the microbiome. Following completion of this course students will have a greater understanding of how microbes shape our world and through laboratory exploration grasp basic techniques and procedures used by microbiologists such as aseptic technique and culturing. LEARNING OUTCOMES: Upon completion of this course, the student will demonstrate basic knowledge in the following: Comparative characteristics of microbial organisms; General bacteriology and microbial techniques; Microbial metabolism and enzymes; Physical and chemical microbial control; Collection and handling of laboratory specimens; Microbial genetics, mutation and biotechnology; Pathogenicity, virulence, and epidemiology; Common bacterial, fungal, and viral diseases.

**BL303** **Biological Diversity and Change** **.5 CU**

A college-level study of biological diversity and the ecological, biogeographic, developmental, geological, taxonomic, anatomical, and molecular bases for the development of diversity over time, which comprises the science of evolutionary biology. Prerequisites: Honors Biology or equivalent, CH102 or higher.

**BL305** **Invertebrate Zoology** **.5 CU**

Zoology is the branch of biology that deals with the study of animals. This course concentrates on the overwhelming majority of all animals, the invertebrates. It will introduce the underlying basic principles of zoology including animal classification, development, comparative morphology, and evolution. This course offers both field and laboratory experiences with animals. Prerequisite: Honors Biology or equivalent.

**BL306** **Vertebrate Zoology** **.5 CU**

Zoology is the branch of biology that deals with the study of animals. This course will cover the taxonomic and anatomical diversity within the phylum Chordate. This course offers both field and laboratory experiences with animals including several dissections. Prerequisite: Honors Biology or equivalent.

**BL307** **Classical Genetics** **.5 CU/quarter**

This course begins with the fundamentals of cell division and focuses on modes of inheritance of traits, beginning with Mendel's pea plants and stressing extensions and exceptions to Mendel's principles. Laboratory activities, problem-solving, and critical thinking skills are emphasized.

**BL308** **Molecular Genetics and Genomics** **0.5 CU/quarter**

This course focuses on DNA. Beginning with Watson and Crick's double-helix model the course focuses on DNA structure, replication, transcription and translation. Current topics in DNA technology, gene cloning and bioinformatics are discussed as well as the ethics of emerging genetic techniques and possibilities. Critical thinking skills and thoughtful data interpretation are stressed.

**BL310** **Marine Biology** **.5 CU/quarter**

The marine environment encompasses the majority of the Earth's biosphere and contains tremendous biological diversity. This one quarter course is an introduction to the common marine organisms of the ocean and examines the abiotic and biotic factors that influence their distribution and abundance. Topics include basic oceanography and ecology principles, the rocky intertidal zone, coral reefs, pelagic and deep-sea communities and ocean conservation.

**BL311, 312                      Anatomy and Physiology 1/2 - 2/2                      .5 CU/quarter**

This two-quarter sequence encompasses the study of the macroscopic, microscopic, and physiological functions of systems of the human body. After an introduction to cell biology and cytology, students explore the structure and function of basic tissues and major organ systems of the body. Animal dissections, light microscopic examination of prepared sections, and physiological experiments supplement lectures. Prerequisites: CH102 or permission of instructor.

**BL313                                      Oceanography                                      .5 CU**

Marine science is an interdisciplinary science field in which geology, physics, chemistry and biology interact in complex ways that are fundamental to the oceanic environment. This course serves as an introduction to physical, chemical, geological and biological oceanography. Current events and topics of interest (ocean acidification, sea level rise, ocean mining, whaling, overfishing, coral bleaching) will be heavily incorporated to give students a solid background in oceanography while also keeping an eye towards developing issues relating to the ocean environment. Prerequisite: BL101

**BL314                                      Biological Systems                                      .5 CU**

Students will gain an understanding of the origin, function and structure of living organisms by examining life at increasing levels of biological complexity, from the molecular and cellular level to whole organisms. This course deals with the biology of cells of higher organisms: the structure, function, and biosynthesis of cellular membranes and organelles; cell growth; transport, receptors, and cell signaling; the cytoskeleton, the extracellular matrix, and cell movements. After developing a foundational understanding of cell biology, this course explores the interactions of these cells to form tissue, organs, organ systems and ultimately complete organisms, and finally students will be able to make predictions about how positive feedback mechanisms amplify activities and processes in organisms based on scientific theories and models. Prerequisite: BL101

**BL351, 352                                      Ecology 1/2 - 2/2                                      .5 CU/quarter**

Ecology is the study of connections in nature. This two-quarter sequence studies the major sub-disciplines and theoretical foundations of ecology. Through the investigation of various habitats in Southern Alabama, students gain experience in conducting field research, data analysis, and writing and presentation of research results. The prerequisite for Ecology 1/2 is Honors Biology or equivalent; CH102 or equivalent; permission of instructor. The second quarter, when offered, is a focused concentration on a limited number of advanced topics. The prerequisite for Ecology 2/2 is Ecology 1/2 - BL351 or permission of the instructor. One or more Saturday field trips will be required per term.



**BL381, 382, 383      AP Biology 1/3 - 2/3 - 3/3      .5 CU/quarter**

This course is an intensive three-quarter, college-level sequence in biology, entailing broad coverage of the entire subject area including biochemistry, molecular biology, genetics, organismal biology, population biology, ecology, behavior, bio-diversity, and evolution. Laboratories include all or most of the recommended AP labs, plus additional laboratories of the instructor's choice. Students who complete the sequence with a cumulative grade of B or better may be encouraged to take the Advanced Placement Exam for Biology at the end of the academic year. Other sequences of courses may also enable the student to cover the AP Biology curriculum and students are encouraged to seek advice from the Biology Department. Prerequisites and corequisites: 1.0 CU of high school honors biology with a grade of A or B; Successful completion or concurrently taking CH102 or above; permission of instructor.

**BL384, 385      AP Environmental Science 1/2, 2/2      .5 CU/quarter**

This course is a two term interdisciplinary course. The course provides students with scientific principles, concepts, and methodologies 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 and/or preventing them. The course considers environmentally based issues such as pollution, habitat degradation, and resource conservation. This course requires a keen interest in issues concerning the welfare and sustainability of the earth. Many of the labs conducted will involve issues relating to pollution and energy. Completion of this course prepares students for the AP Environmental Science exam. Prerequisites: Honors Biology or equivalent.

**BL400      Directed Research; Directed Reading      .5 CU/quarter**

Directed Research in biology involves intensive investigations in biology under the auspices of a biology faculty member who mentors a student's research. Students wishing to participate in a directed reading/research in Biology are usually expected to make a 3-quarter commitment. The biology faculty views the award of 0.5 CU/quarter of credit for independent study with the greatest seriousness. A student wishing to do a Directed Research must anticipate a substantial time commitment, averaging four to six hours per week, either on a weekly basis or in concentrated time periods such as weekends. Modifications to these criteria may be considered on an individual basis.

## Chemistry

### **CH090                      Introductory Chemistry                      .5 CU**

A one-quarter course designed to review and expand the math-based problem solving skills of sophomore students and to introduce some fundamental chemistry topics like atomic structure, stoichiometry, solutions, and pH. Problem solving requiring application of mathematical skills will be emphasized and will include the use of exponents, algebra, and log functions. Prerequisites: open to sophomore students only.

### **CH101, 102                      General Chemistry 1/2 - 2/2                      .5 CU/quarter**

A two-quarter sequence providing a general survey covering the fundamentals of chemistry including, but not limited to, dimensional analysis, atomic structure, nomenclature, acid/base chemistry and reaction types. Prerequisites: None

### **CH201, 202, 203                      AP Chemistry 1/3 - 2/3- 3/3                      .5 CU/quarter**

AP Chemistry is a three term sequence designed to introduce the student to current theory and practice in Chemistry and to prepare the student to take the Advanced Placement (AP) Chemistry Test. Topics which are discussed include the structure of atoms and molecules, reactions in aqueous solutions, thermodynamics, and stoichiometry. Prerequisites: CH090, CH101/102 or passing score on qualifier.

### **CH204                      Advanced General Chemistry                      .5 CU**

A one-quarter chemistry elective designed for students who wish to pursue further studies in chemistry. It expands the student's background in the fundamental laws, facts, principles and applications of chemistry. Topics which might be covered include Lewis Structures, models of covalent bonding, colligative properties of solutions, REDOX Reactions, chemical kinetics, chemical equilibria, thermodynamics, electrochemistry, nuclear chemistry. Prerequisites: CH102 or a passing score on qualifier.

### **CH215                      Environmental Chemistry                      .5 CU**

This course is designed to expand the student's background in chemistry. It is a one-quarter course focusing on the environmental chemistry. It will include discussions about air, water, energy, plastics, drugs, and nutrition. Prerequisite: CH102 or a passing score on the qualifier.

**CH301                      Inorganic Chemistry                      .5 CU**

This one quarter chemistry elective is designed for students to have a strong interest in chemistry. This course will expand the student's background in chemistry, focusing on the properties and reactions of the elements other than carbon. Topics presented may include symmetry operations, ionic & covalent bonding, 3-D molecular structures and crystal packing. Prerequisites: CH102 or CH202, or a passing score on qualifier. This class is not offered every year.

**CH303                      Introduction to Organic Chemistry                      .5 CU**

A one-quarter chemistry elective designed for students who have a serious interest in chemistry and/or the life sciences. This course covers fundamental topics such as functional groups, nomenclature, isomers, structure/physical property relationships and reaction types. Prerequisites: A grade of "B" or better in CH101, 102, completion of CH201, 202, 203 or permission of the instructor.

**CH306                      Introduction to Biochemistry                      .5 CU**

Establishes a foundation in the broad field of biochemistry. The structure-function relationship of proteins, enzymes, carbohydrates, lipids and nucleic acids will be discussed in class and explored in the laboratory. The metabolism of carbohydrates and lipids will be included. Prerequisites: A grade of "B" or better in CH101, 102 or CH201, 202, 203. Completion of CH303 and BL102 is recommended.

**CH307                      Organic Chemistry                      .5 CU**

A one-quarter chemistry elective for students who have a strong interest in chemistry or the life sciences. This course builds on the material covered in CH303 and provides a more in-depth study of the chemistry of organic compounds. Reactions of each functional group will be studied with an emphasis on 3-D structures and reaction mechanisms. Topics will include molecular models, compound & reaction stereochemistry, and multi-step synthesis. Prerequisites: CH303 or permission of the instructor.

**CH400                      DR: Pyrotechnics                      0.25 or 0.5 CU**

An introduction to the specific chemistry and careful technique involved in the safe production of fireworks and pyrotechnic effects like noise, light and colors. Prerequisites: completion of CH102 or CH202 and permission of the instructor.

**CH400                      DR: Spectroscopy                      0.25 or 0.5 CU**

The Spectroscopy course will introduce the student to spectrometric techniques such as Mass spectroscopy (MS), InfraRed spectroscopy (FTIR) and Nuclear Magnetic Resonance (NMR) spectroscopy. Students will gain knowledge of the theory of spectroscopy and structure elucidation. Prerequisites: completion of CH303 and CH307 and permission of the instructor.

## **Computer Science**

### **CS101      Computer Science: Principles      .5 CU**

Computation has changed the way people think, work, live, and play. Our methods for communicating, collaborating, problem solving, and doing business have changed and are changing due to innovations enabled by computing. Many innovations in other fields are fostered by advances in computing. Computational approaches lead to new understandings, new discoveries, and new disciplines. Students in this course will become familiar with many ways in which computing enables innovation, and they will analyze the potential benefits and harmful effects of computing in a number of contexts. Prerequisites: none.

### **CS114      Introduction to Programming with Alice      .5 CU**

Programming concepts are introduced in a drag-and-drop environment called Alice that is currently updated and maintained at Carnegie Mellon University. Some of the concepts covered are classes, objects, expressions, parameters, methods, conditionals, iteration, concurrency, and events. Students learn to make movies that are animations of objects based on an existing library that can be extended in different ways by each student. Manipulation of objects in 3D space is both an objective in creating certain animations and a tool that lends insight into how computer software is engineered. Prerequisites: none.

### **CS116      Data Science with Python      .5 CU**

Programming concepts are introduced in this Python course. The pace of the course is designed to lead to mastery of each of the topics discussed in class. Simple data analysis will be used as the programming exercises through the course. The course will focus on planning and organizing programs, as well as the grammar of the Python programming language. You can do the programming assignments for the class using a web browser, your personal computer or PyCharm. You will create visualizations of data using matplotlib, import data from Excel and SQL, work with API data, and manipulate DataFrames with pandas. Prerequisites: CS101 (Computer Science Principles) and MA-205 (Statistics)

### **CS117      Microcomputer Applications      .5 CU**

This course provides an overview of common business office technology usage, including operating systems functions, Internet technologies, and productivity suites. The course focuses on basic working knowledge and hands-on experiences in word processing, spreadsheet processing, relational database processing, and presentation software. Prerequisites: CS101 (Computer Science Principles)

**CS140                      App Development                      .5 CU**

App Inventor for Android is an open-source web application originally provided by Google, and now maintained by the Massachusetts Institute of Technology (MIT). This program will allow newcomers to computer programming to create software applications for the Android operating system. It uses a graphical interface, like Scratch the Cat, which allows users to drag-and-drop visual objects to create an application that can run on Android devices. Prerequisites: CS101 (Computer Science Principles)

**CS210                      Database Design & SQL (Structured Query Language)                      .5 CU**

Database Design and SQL (Structured Query Language) will be introduced in this course using relational databases. Students will be introduced to a history of database management covering hierarchical, network, relational and object-oriented models with a focus on the relational model and its operators. Students will be presented with a methodology for relational database design using Entity Relationship Diagrams and normalization of data. An overview of the functions of the Database Management System (DBMS) and of a Database Administrator (DBA) will also be presented. Prerequisites: CS101 (Computer Science Principles)

**CS216                      C#                      .5 CU**

Students will learn basic C# programming, various advanced concepts related to the C# programming language, and the integrated development environment for C# that includes drag and drop creation of forms. IntelliSense is used to introduce students to event driven programming. Students will be introduced to MVC concepts including system components and their interaction. Prerequisites: CS101 (Computer Science Principles)

**CS220                      Webpage Development                      .5 CU**

Every webpage you look at is written in a language called HTML. You can think of HTML as the skeleton that gives every webpage structure. In this course, we'll use HTML to add paragraphs, headings, images and links to a webpage and then combine that with CSS to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications. Then we'll learn JavaScript to update and change both HTML and CSS. JavaScript can calculate, manipulate, and validate data. With these three languages, you will have the skills to bring your website design to life. Prerequisites: CS101 (Computer Science Principles)

**CS311, 312, 313      AP Computer Science A I, II, III      .5 CU/quarter**

This course teaches programming in a problem-driven way that focuses on problem solving rather than syntax. We make introductory programming interesting by using thought-provoking problems in a broad context. The central thread of early chapters is on problem solving. Appropriate syntax and library are introduced to enable readers to write programs for solving the problems. To support the teaching of programming in a problem-driven way, the course provides a wide variety of problems at various levels of difficulty to motivate students. To appeal to students in all majors, the problems cover many application areas, including math, science, business, financial, gaming, animation, and multimedia.

The course focuses on fundamentals first by introducing basic programming concepts and techniques before designing custom classes. The fundamental concepts and techniques of loops, methods, and arrays are the foundation for programming. Building this strong foundation prepares students to learn object-oriented programming and advanced Java programming. Students are expected to take the AP Computer Science A Exam in the Spring. Prerequisites: CS101 (Computer Science Principles)

**CS321, 322, 323      Advanced Java I, II, III      .5 CU/quarter**

This comprehensive version covers fundamentals of programming, object-oriented programming, GUI programming, algorithms and data structures, concurrency, networking, internationalization, advanced GUI, database, and Web programming. It is designed to prepare students to become proficient Java programmers.

Prerequisites: CS311, CS312, and CS313 (AP Computer Science A) & CS210 (Database Design and SQL).

**CS245      Computer Ethics      .5 CU**

This course will survey the various issues surrounding computer ethics. The goal is to examine different ethical situations that arise in IT as well as offer practical advice for addressing those issues. Topics include Internet Crime, Privacy, Freedom of Expression, Intellectual Property, etc. For each chapter, the students will be introduced to an ethical dilemma where they will be prompted to list each alternative, consider the consequences, and implement a decision. Prerequisites: CS101 (Computer Science Principles)

## English

### EN091                      Sophomore English                      .5CU

An introductory course in critical thinking, reading and writing, this course teaches students how to analyze both ideas and texts and how to communicate that analysis in clear, coherent prose. Various rhetorical strategies will be followed, and texts from a variety of areas will be studied. Emphasis is placed on the writing process itself: planning, execution, and revision. Students will also learn to evaluate the quality of sources on the web and in print. Required for Sophomores. Prerequisites: none.

### EN092                      American Literature I                      .5 CU

This course in critical thinking and writing, required for Sophomores, is equivalent to a college-level course in composition and literature, and uses 19th Century American Literature as a point of reference. Students learn how to analyze texts and translate their ideas into the form of the standard college essay. Prerequisites: EN091.

### EN101                      American Literature II                      .5 CU

This course, required for Juniors, covers American literature published after 1900. Students will develop analytical skills and polish their writing techniques through research assignments that ask them to cite reliable web resources as well as print articles and scholarly books to support their own interpretations of American literary works. Prerequisites: none.

### EN120, 121, 122      AP English Language and Composition                      .5 CU/quarter

The AP English Language and Composition course focuses on rhetorical analysis of nonfiction texts and the development and revision of thoughtful, evidence-centered, analytical and argumentative writing. Students in this introductory college-level course read and carefully analyze a broad and challenging range of nonfiction prose selections, deepening their awareness of rhetoric and how language works. Through close reading and frequent writing, students develop their ability to work with language and texts with a greater awareness of purpose and strategy, while strengthening their own compositional abilities and awareness as writers. Course readings feature expository, analytical, personal, and argumentative texts from a variety of authors and historical contexts. Prerequisites: Junior year.

### EN201, 202                      British Literature 1/2 - 2/2                      .5 CU/quarter

This two-term sequence is a college-level British literature survey covering major works and authors from the Old English period through the 21st century. Historical background and critical interpretation of works of poetry, drama, and prose are to be emphasized through web research and consultation of online databases. Further development of analytical writing techniques will take place through both short and long interpretive essay assignments. Prerequisites: EN 101 and one English elective in Junior year.

**EN204 Journalism, Media Literacy & Mass Communication .5 CU/quarter**

Students will study the fundamental principles of how journalists work: gathering, writing, reporting, and editing the news. Discusses the relationship between the media and society throughout history and the influence of one on the other. Explores various theoretical approaches to understanding and explaining the communication process and how it affects society. The course will also emphasize how to interact with news in the age of social media and ever-broadening technology, as well as how to tell the difference between truth and fiction. *Prerequisites: None*

**EN206 Writing About Film: Analysis & Criticism .5 CU**

An introductory course in the analysis of film as a means of story-telling through the use of dramatic and pictorial technique. The only truly new art form since the dawn of history, the movies have shaped modern culture in remarkable ways. We will watch and discuss an array of American movies, representing a variety of genres, for both their literary qualities of character and theme, and the techniques of directing, acting and cinematography that produce them. Writing intensive. Prerequisites: none.

**EN207, 208, 209 AP English Literature and Composition .5 CU/quarter**

The course is intended to prepare students wishing to take the AP English Literature exam. It will cover the more comprehensive AP reading list as well as train them for the particular tasks required by the standardized test itself. The course is a yearlong commitment with a third quarter that will be counted towards an English concentration. Students will also work with online scholarly databases to compose college-level research essays. The reading load is heavy; as a result, students are asked to sign up before the summer break so that they will be able to prepare. Prerequisites: Senior standing and permission of instructor.

**EN211 Shakespeare on Stage .5 CU**

This course is an approach to Shakespeare that combines literary analysis with dramatic performance. Characters and ideas will be studied, but so will their dramatic interactions, by taking key scenes and enacting them as well as reading them. Five plays will be selected from such favorites as *Hamlet*, *A Midsummer Night's Dream*, *Macbeth*, *As You Like It*, *Julius Caesar*, *Romeo & Juliet*, *The Taming of the Shrew*, *1 Henry IV*, *Twelfth Night*, *Much Ado About Nothing* and *Richard II*. Prerequisites: none. Recommended for second term Sophomores and above.



**EN217 Gothic Studies: Gothic Literary Classics their Interdisciplinary Contexts .5 CU**

This course will survey classic works of Gothic Literature from the 19th century, while also exploring some of the historical, social, artistic, and even scientific and economic contexts of those classic texts. The course will **include** an exploration of classic film versions of these Gothic texts that were produced and released in the early 20th century. Therefore, this course will not only explore the original versions of classic works of Gothic literature and film, but it will also reveal some of the interdisciplinary origins and contexts of these Gothic classics that **contributed** to the still popular forms of the Gothic that students are more familiar with in current popular culture. Texts will include Mary Shelley's Frankenstein (1818), Robert Louis Stevenson's The Strange Case of Dr. Jekyll and Mr. Hyde (1886), Oscar Wilde's The Picture of Dorian Gray (1891), and Bram Stoker's Dracula (1897). Film versions and adaptations will include Nosferatu (1922), Dracula (1931), Frankenstein (1931), Dr. Jekyll and Mr. Hyde (1931/1941), and The Picture of Dorian Gray (1945). Prerequisites: none.

**EN218, 219 Survey of African American Literature .5CU/quarter**

This course provides a survey of the development of African-American literature from its beginnings to the present. Emphasis is placed on historical and cultural context, themes, literary traditions, and backgrounds of the authors. Upon completion, students should be able to interpret, analyze, and respond to selected texts. Readings will be from the oral tradition, through modern writers Maya Angelou, Toni Morrison and two-time Pulitzer prize winner Jesmyn Ward. This will be an intensive reading and writing class. Prerequisites: None. Open to grades 11 and 12 only. Two term course; Part 1/2 is not a prerequisite for Part 2/2.

**EN220 Creative Writing .5 CU**

This course develops a student's talent in writing short stories and poetry. The workload includes regular exercises and assignments. Besides writing their own creative pieces, students will analyze literary works. Prerequisites: EN101.

**EN221 Advanced Prose Writing .5 CU**

This course presents advanced techniques of prose for students with professional journalistic ambitions, or students who simply wish to improve papers and style. Emphasis is on style, rhetoric, and rhythm, as well as clear, hard, imaginative thought. Weekly writing assignments are required. Prerequisites: EN101.

**EN223                      Satire Writing                      .5 CU**

Satire is arguably the most difficult form of writing to master; it requires a thorough understanding of argumentation and essay writing strategies, the specific issue for discussion, and how humor works (which is much more difficult than many imagine). This class will be a study of all three of these topics and how they work together to produce a satirical piece of writing. The course will begin with a review of argumentation and research strategies before moving on to study the tools of satire, including irony, parody, exaggeration, hyperbole, and more. We will also discuss the importance of satire in western culture and the impact it has had historically and today by examining classic pieces of satire such as Jonathan Swift's "A Modest Proposal" and modern examples like "Last Week Tonight" and "The Daily Show". This is a writing intensive class.

**EN222                      Chaucer and the Road to Canterbury                      .5 CU**

What do we learn when we join Chaucer's motley crew as they ride from Southwark down to the great cathedral? We learn, among other things, what it means to be a knight, a fiercely independent widow, a religious con-man, a physician in a time of plague, a smuggler, a businessman who is also a monk, a bigoted prioress, a handsome young squire, a wealthy landowner, a crooked miller, a religious cop who practices extortion and a number of others. Hierarchy, chivalry, religious controversy, marriage, the role of women, the plague and politics are among the topics that they discuss – and so will we. Students will use online databases to research historical topics pertaining to the literature, and they will use web texts to contrast Chaucer's Middle English with our own Modern English. Prerequisites: none; recommended for second term Sophomores and above.

**EN225                      Discovery and Conflict                      .5 CU**

This course attempts to define tradition and change as they relate to human nature and hence to civilizations. A cross-disciplinary approach will examine three major scientific discoveries and their consequences, including ideological wars and the "threat" of science. Texts will include both scientific sources and fiction, and an interdisciplinary team of teachers will help teach various units. Grades, in general, will be accorded through analytical papers and projects. Prerequisites: Senior status.

**EN229      Victorian Women's Studies (Cross-Reference English/Women's Studies)      .5 CU**

This course explores Victorian women's thoughts and feelings as evinced in their writings as well as their own lives. Students will explore class distinction/birthright and gender in relation to the design of a woman's life as well as the pull of duty and family obligation. Prerequisites: none.

**EN230 the Philosophical Background of Literature .5 CU**

The course introduces the student not only to the various important schools of literature (and art), from Platonic to Romantic to Post-Modernist, but serves as a basic introduction to the ideas and disciplines of philosophy itself. The student will therefore a) practice philosophizing by asking and answering the great questions of humanity and b) learn to apply this foundational knowledge in philosophy and ideas to the understanding of literature as art. Prerequisites: EN 092.

**EN231 Classics of World Film .5 CU**

We will study movies by some of the greatest directors from around the world – including such figures as Bergman (Sweden), Kurasawa (Japan), Lang (Germany), Reed (UK), Truffaut (France), Da Sica (Italy), Bunuel (Spain) Eisenstein (Russia), Coppola (US), and others. The nature of the story told, and how it reflects both universal human concerns, and the more specific ideas of the culture and the director, will be discussed. Prerequisites: none.

**EN237 Brave New Worlds: The Dystopian Novel .5 CU**

Long before the Fallout video game franchise exposed players to its dark vision of an America gone wrong, there existed the dystopian novel, a literary genre devoted to alternate histories in which oppressive or depraved governments seize control and terrorize their citizens. Contemporary examples of dystopian fiction include the books in Suzanne Collins's The Hunger Games series, but this course will focus more on the foundations of the genre, beginning with the utopian discourses of Plato and Sir Thomas More, proceeding to the nineteenth-century semi-dystopia of Charles Dickens's Hard Times, and then moving on to the dystopian environments envisioned by Aldous Huxley and George Orwell. Students will also engage with online readings of short stories and analytical articles. The assigned essays will explore what political and social change creative writers seek to advance when they let their dark imaginations run wild. Prerequisites: none.

**EN238 Constructs of Self .5 CU**

This course will explore constructs of self and representations of identity through and within the lens of contemporary literature. The purpose of this course is to challenge students to attempt to unravel a multiplicity of identifications (cultural, social, socio-economic, gender, etc.) and explore the ways in which identity (the "self") is appropriated. Students will also consider such representations in film adaptations of particular texts. Prerequisites: none.

**EN239 Speech Communications .5 CU**

This course, required for Juniors, introduces students to the fundamentals of public speaking while also helping them further develop their written communication skills. Students will use digital media to make presentations and projects that engage their audiences. Prerequisites: none.

**EN240** **Advanced Speech Communications** **.5 CU**

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In this course, students will further cultivate the skills acquired in Speech Communications as they prepare and deliver multimedia presentations on contemporary issues, their studies at ASMS, and, if applicable, their ongoing research projects. The coursework is intended to professionalize students by molding them into confident communicators. Prerequisites: EN239.

## **Fine Arts**

### **AR102                      Graphic Design and Computer Graphics 1/2                      .5 CU**

This course introduces students to methods of communicating and interpreting visual information. Through a series of lectures and problem-solving exercises, using the latest graphic design computer software, students learn to communicate visual information clearly and in innovative ways. In addition, students briefly study the history of type forms and their usage. Upon completion of this class, students understand design techniques used in advertising and television, and are able to employ those same techniques to generate presentations that can be used in any visual media.

Prerequisite: none.

### **AR106                      Painting                      .5 CU**

This course presents the fundamental techniques of painting. Using a wide range of problem solving exercises, students learn about preparing various surfaces, using painting tools, mixing colors and analyzing surface qualities. The integration of drawing and design concepts is emphasized as students investigate color-value relationships, the articulation of form, composition and symbolic formal relationships. Working primarily from observation, students explore subjects ranging from still life, interiors, landscapes, cityscapes, self-portraits and the figure. Prerequisite: none.

### **AR107                      Drawing 1/2                      .5 CU**

This course is for beginning through advanced students in drawing. It will introduce technical and conceptual devices artists have traditionally used in representing appearances and ideas. Course sections will deal with basic design principals, gesture drawing, contour drawing, value drawing, linear and atmospheric perspective, and thematic development. Prerequisite: none.

### **AR108                      Ceramics I                      .5 CU**

This course gives students the opportunity to learn basic ceramic skills using clay and glaze materials and to foster those skills to develop creative thinking. Students will learn hand-building techniques, practice on the potter's wheel and work with a variety of clay surface designs. Prerequisite: none.

### **AR109                      Sculpture                      .5 CU**

A beginning sculpture course which covers the techniques, materials and concepts of three-dimensional design through projects using fibers/textiles, plaster, clay, wood, and metals. Formal design concepts will be emphasized as students investigate color and value relationships, the articulation of form, composition, and symbolic formal relationships. In addition, the course will address contemporary issues related to sculpture and design. Prerequisite: none.



**AR121                      Advanced Digital Photography                      .5 CU**

This course introduces students to digital photography, digital media editing and the principles of 2D design. Through a series of lectures and hands-on exercises students will learn and use all of the functions and menu items of a typical digital SLR. The software used in the class will be Adobe Photoshop and Adobe Camera Raw. Topics include: camera and lens functions, media storage, file types, exposure, white balance, design, natural lighting, artificial lighting, image editing, printing and display. Upon completion of this class students should be able to take professional looking photos and know how to properly prepare them for use in printed or digital media. The course will consist of tests, assignments and hands-on evaluations. Prerequisite: none.

**AR125                      Enameling                      .5 CU**

Vitreous or Porcelain Enamels are made by fusing colorful glass powders to a metal substrate, typically copper or silver. Students will learn and focus on Limoges and Cloisonné, two very popular enameling techniques. The basics of shaping and preparing metals for enameling will be followed by an introduction to more advanced metal smiting techniques. Students can make jewelry, small metal sculptures, functional objects, and two-dimensional designs. Prerequisite: none.

**AR200                      Printmaking                      .5 CU**

Students will learn basic techniques in the various forms of printmaking: intaglio, relief, silk screen, and collagraphy. Traditional, as well as contemporary techniques using computers will be used in the class. The integration of drawing and design concepts is emphasized as students investigate color-value relationships, the articulation of form, composition and symbolic formal relationships. The emphasis is on learning the basics, which leads to personal experimentation and refinement of a student's work. Prerequisite: Permission of the instructor.

**AR201                      Survey of Art                      .5 CU**

Survey of Art starts with brief examination of design, followed by a chronological and stylistic survey of painting, sculpture, and architecture illustrated through lecture, slide presentations, class discussion, and film. Emphasis is placed on the principles and vocabulary of art criticism and aesthetics. Prerequisite: senior standing. Survey can only be taken as a junior with special permission form the instructor and counseling in preparation for AP art.

**AR328, 329, 330                      Advanced Art 1/3 - 2/3 - 3/3                      .5 CU/quarter**

Advanced Art is for junior level students who are interested in taking A.P. Art in their senior year. The course prepares students for the Breadth section of A.P. exam. Students will work on projects that develop conceptual, design, and technical skills. The outline of projects is derived from the A.P. exam requirements. Projects completed in this class may be used for the A.P. portfolio. Prerequisite: Permission of instructor.

**AR331, 332, 333      AP Studio Art 1/3 - 2/3 - 3/3      .5 CU/quarter**

This three-quarter sequence is designed for students who are interested in experiencing college-level content in the visual arts. The course involves the study of art history, design theory (the formal analysis of information communicated visually), learning technical skills, and the development and use of techniques for creative thinking. Students choose to work primarily in one of the specific areas of study offered: drawing, painting, printmaking, ceramic sculpture, pottery, computer graphics, book arts, and interactive multimedia. Students who wish AP credit are strongly advised to take the entire sequence. Prerequisite: AR102. Corequisite: AR201. AP Art is recommended for senior year; juniors may enroll with instructor approval.

**MU054      Wind Ensemble      .25 CU/quarter**

Wind Ensemble gives band students an opportunity to experience the Wind Ensemble concept. Students will perform traditional and modern concert band literature with an emphasis on that literature which lends itself to our unique instrumentation. This is a full-year course. Prerequisite: basic proficiency on a concert band instrument.

**MU055      Jazz / Lab Band      .25 CU/quarter**

Jazz / Lab Band gives band students an opportunity to experience the jazz/rock/swing musical genres. Students will learn proper jazz articulations, read jazz charts, play in a variety of styles, learn basic jazz choreography, and solo techniques. Students will also learn the history of jazz-one of the truly original American contributions to music. This is a full year course. Prerequisite: basic proficiency on an instrument played in the jazz band. These instruments are Alto, Tenor, Bari Sax, Trumpet, Trombone, Guitar, Bass, Keyboards, Drum Set, and Auxiliary Percussion.

**MU063      Garage Band      .25 CU/quarter**

Garage Band is a unique course that gives students the basics of performing in a rock-and-roll band. Typical instrumentation is lead guitar, rhythm guitar, bass guitar, keyboards, vocals, drum set and sound-system set-up and management. Augmentation to this instrumentation will be at the discretion of the band director. This is a full year course. Prerequisite: This course is not for beginners. Students should already know how to read music and/or tab and be proficient on their instrument.

**MU064      Chamber Ensembles      .25 CU/quarter**

Chamber Ensembles are offered according to the instrumentation in the band. Examples of past chamber ensembles are: Flute Choir, Clarinet Choir, Brass Quintet, String Quartet, and Percussion Ensemble. These ensembles are designed to develop skills that will aid the individual in effectively performing ensemble literature that challenges his/her abilities. Prerequisite: Proficiency on the instrument for which the chamber ensemble is designed.



**MU111                      Concert Choir                      .25 CU/quarter**

Choir is designed to provide opportunities to learn correct vocal technique, anatomy of the singing instrument, pitch and rhythmic accuracy, intonation, diction, musicality, and the joy of creating wonderful music. This is accomplished by giving the students the opportunity to experience performing vocal music of the traditional to contemporary styles. Activities include: singing, listening, reading music, and movement. Students learn to read music through a practical, organized, and sequential system. It requires no prior music reading experience on the student's part. Emphasis is placed on performance and participation. This is a full-year course. Prerequisites: none.

**MU114                      Guitar                      .25 CU/quarter**

Guitar lessons offer students of any level of development opportunities to expand his/her knowledge of the guitar and of music theory as applied to the guitar. Students will learn music notation, chord construction and progression, scales, and various left and right hand techniques. These lessons will be beneficial to developing the student's musical artistry when applied to any style of music. Prerequisites: none.

**MU115                      Voice                      .25 CU/quarter**

Voice lessons are for students who participate in Concert Choir and want to have additional training in standard Classical or Musical Theatre solo repertoire. Instruction focuses on correct vocal technique including posture, breath support and vowel placement. One 30-minute lesson per week and daily practice are required. Students must read music or be enrolled in MU121. Prerequisites: audition and permission of the instructor.

**MU119                      Vocal Ensemble                      .25 CU/quarter**

The Lambda Singers are a small ensemble of twelve to sixteen singers selected from the Concert Choir by audition. Participation in Concert Choir is required. Singers in this group need good sight reading skills and the ability to carry a vocal line independently. This group specializes in a cappella singing and vocal jazz. This is a full year course. Prerequisite: MU111 and an audition.

**MU120                      Jazz and the American Musical Theatre                      .5 CU**

Jazz and the American Musical Theatre is a survey course that traces the development of two distinctly American musical genres that emerged simultaneously in the early 20th Century. Using historic recordings and films students hear and see the landmark works of composers and performers starting in 1890 with the field hollers of Southern farm workers and Vaudeville shows to present day. Prerequisite: none.

**MU121 Introduction to Music Theory .5 CU**

Introduction to Music Theory is a course in the basics of music reading, piano, and sight-singing. It is designed for students interested in learning to read music but know either nothing or very little about it. Notation of pitch, rhythm, keys, and chords and their relationship to the piano keyboard will be studied and practiced. The basics of sight-singing will help the student sing music notation without the aid of the piano. This course is highly recommended for choral students who do not currently read music.

Prerequisite: none.

**MU122 Sight Singing and Ear Training .5 CU**

Audiation is the ability to look at written music and immediately hear it in your head. Sight Singing and Ear Training techniques develop this ability and are essential for acquiring fluency in reading music. Briefly introduced in MU121, this course focuses on in-depth study and practice of sight singing, music dictation, hearing chord progressions, and musical form.

Prerequisite: MU121

**MU202 Survey of Music .5 CU**

The primary objective of this course is to give the student an understanding of the development of Western Music from the Middle Ages to the present day. The focus of the course will be study of musical literature with a high degree of emphasis on listening. Major works from all instrumental and vocal genres will be studied.

This is a one term course. Prerequisites: Senior status.

**MU203, 204, 205 Advanced Music Theory 1/3 - 2/3 - 3/3 .5 CU/quarter**

This series of courses is for the serious instrumentalist or singer who is already a proficient music reader. Students study in depth the principles of musical construction developed during the Common Practice Period in Western Music. Concepts covered are: major and minor scales and keys, chord construction and quality, harmonic analysis, chord progressions, melodic construction, voice leading in four parts, sight-singing, and melodic and rhythmic dictation. Prerequisite: MU121/122 or permission of the instructor.

**TH151 Theatre Arts I .5 CU**

Theatre Arts I is an introductory level course designed to give the beginning theatre student hands on experience in both the technical and performing areas of play production and performance. Students will learn how actors are trained through activities in pantomime, improvisation, voice production, stage movement, and the preparation and performance of short scenes and skits. The specialized areas of technical theatre will be explored through in class projects in costuming, lighting, properties, and set design. Emphasis is placed on the highly collaborative aspect of theatrical production. The Greek word drama means "to act" or "to do", so willing enthusiastic participation is essential. Prerequisites: none.

**TH152 Theatre Arts II .5 CU**

Theatre Arts II explores the actor training method developed by Constantan Stanislavski in the early 1900's. Known as "The Method," the Stanislavski principles have become the basis for the current day teaching of acting. The course text not only explains these principles but provides acting exercises to practice them. Monologs, scenes, or a One Act play will be performed for the final. Prerequisite: TH151 or permission of instructor.

**TH153 Theatre Production on Theatre Arts II .5 CU**

Theatre Arts II produces and performs a full length play on the West Campus stage. Students cast in the selected play will also be responsible for any work involved with props, costumes, scenery, lighting, makeup, and publicity. This class meets winter term and requires students to stay on campus to rehearse and perform for two weekends: the Martin Luther King holiday weekend and the following Thursday through Sunday. This course may be taken more than once with instructor's permission. Prerequisites: Permission of the instructor and TH151, previous participation in Special Projects "Curtain Up!" or audition.

## **Foreign Languages**

### **LC101, 102          Beginning Latin 1/2 - 2/2          .5 CU/quarter**

This course will introduce students to the rudiments of the verb system, the first - second declensions of nouns and adjectives, and other basic forms and functions of Latin grammar. The student will develop the ability to translate passages of Latin. In addition, there is a strong cultural component on Roman civilization and its continuing impact. Precise content will vary, but the student will receive reasonable notice pertaining to reading lessons or other responsibilities.

### **LC201, 202          Intermediate Latin 1/2 - 2/2          .5 CU/quarter**

Part I will enhance the basic understanding of Latin forms of grammar and vocabulary, as well as translation/reading skills and the appreciation of Roman culture all undertaken in the first part of the Latin sequence. Part II will attempt to strengthen the student's translating skills via connected passages of Latin authors.

### **LC301, 302          Advanced Latin 1/2 - 2/2          .5 CU/quarter**

This course will strengthen and enhance the student's skills and capacity for translating and reading Latin, with the hope-expectation that the student could easily transition to college intermediate reading/translating courses in Latin. A Latin author's annotated text will be translated and studied. The selections from authors vary but may include those from Ovid, Augustine, Venerable Bede, Cicero, and the Vulgate Bible.

### **LC401                  Readings in Latin                  .5 CU**

A Directed Reading course, in which authors may vary, determined by the instructor and the student on an individual basis. These readings follow Advanced Latin 1/2 and 2/2 – LC301, 302.

### **LC105, 106          Beginning Greek 1/2 - 2/2          .5 CU/quarter**

An introduction to Classical Greek language and literature. This course may not be used to fulfill the ASMS language requirement. It is an introduction to Classical Greek language, literature, and culture similar in scope to the Beginning Latin course, q.v.

### **LC107, 108          Intermediate Greek 1/2 - 2/2          .5 CU/quarter**

This course continues to develop the student's working knowledge of the verb system, other grammar, and vocabulary. There is increasing familiarity with the Lexikon (library copy, office copy). Help is available through such websites as "Greek-gram." The student is introduced to passages from the authors (Epistle to the Galatians, Plato's Republic, etc.) and some Greek epigraphy (inscriptions and their study).

**LC150**                      **Directed Reading: Greek**                      **.5 CU/quarter**

A Directed Reading course in which authors may vary, determined by the instructor and the student on an individual basis.

**LF101, 102**                      **Beginning French I & II**                      **.5 CU/quarter**

This two-quarter sequence provides students with an introduction to the French language, and a lot of exploration of the culture, cuisine, and geography of the Francophone world. Although students will develop communicative competence across all modes of communication (listening, speaking, reading, writing), French phonetics (the study of the production of speech sounds) are introduced with the goal of achieving native-like pronunciation. Special attention will also be given to the intricacies of the French orthography vis-à-vis French phonetics in order to develop interpretive listening and interpretive reading. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. As the terms progress, this course sequence moves towards increasing use of French.

Prerequisites: LF 101: None LF 102: Successful completion of LF 101 or equivalent

**LF201, 202**                      **Intermediate French I & II**                      **.5 CU/quarter**

This two-quarter sequence is a continuation of the Beginning French sequence. Students will further develop communicative competence across all modes of communication (listening, speaking, reading, writing), with skills progressing from interpersonal and presentational speaking to descriptive and narrative writing, including the basics of French grammar taught comparatively. Geographical knowledge is connected to cultural insights. A wide variety of communicative, task-based approaches to language instruction is adopted in which students engage in communicative activities (including culinary adventures) that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught almost entirely in French.

Prerequisites: LF 201: Successful completion of LF 102 or equivalent

LF 202: Successful completion of LF 201 or equivalent

**LF301, 302**                      **Advanced French I & II**                      **.5 CU/quarter**

In this two-quarter sequence, students are exposed to many different styles of writing including prose, poetry, and non-fiction. Written proficiency is developed through compositions that focus on a variety of different writing styles including exposition, persuasion, narration, and description, and which solidify the grasp of more complex French grammar skills. An emphasis is placed on presentational speaking and increased class discussion. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught almost entirely in French.

Prerequisites: LF 301: Successful completion of LF 202 or equivalent

LF 302: Successful completion of LF 301 or equivalent.

**LF401, 402, 403      Fourth Year French I, II & III      .5 CU/quarter**

This three-quarter sequence offers more in-depth guided exploration of Francophone literature and culture. Cultural, historical or literary topics brought to light through a variety of materials (usually including an in-depth reading of *The Little Prince*) are examined through class discussions and written compositions. Written proficiency is developed through a comprehensive review of French grammar. The particular content focus is adaptable to the strengths and goals of each year's learner group and may not be replicated identically the following year. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught entirely in French.

Prerequisites: LF 401: Successful completion of LF 302 or equivalent

LF 402: Successful completion of LF 401 or equivalent

LF 403: Successful completion of LF 402 or equivalent

**LF501, 502, 503      Directed Reading in French      .25 – 1.5 CU/quarter**

This Directed Reading is intended primarily for French students who have completed the Fourth Year French sequence and would like to continue studying French more independently. The topic and content will be determined jointly by the instructor and individual student(s) and could focus on current events, literature, any one Francophone country or various other areas of study. Emphasis is placed on developing oral and written proficiency through self-guided reading, writing, and discussions in French. This Directed Reading is taught entirely in French, and may not be offered every quarter or every year. Prerequisites: Successful completion of LF 403 or equivalent

**LG101, 102      Beginning German I & II      .5 CU/quarter**

This two-quarter sequence provides students with an introduction to the German language, culture and geography. Although students will develop communicative competence across all modes of communication (listening, speaking, reading, writing), German phonetics (the study of the production of speech sounds) are introduced with the goal of achieving native-like pronunciation, and grammar fundamentals are established comparatively with the goal of developing proficiency in presentational and descriptive writing. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. As the terms progress, this course sequence moves towards increasing use of German.

Prerequisites: LG 101: None; LG 102: Successful completion of LG 101 or equivalent

**LG201, 202                      Intermediate German I & II                      .5 CU/quarter**

This two-quarter sequence is a continuation of the Beginning German sequence. Students will further develop communicative competence across all modes of communication (listening, speaking, reading, writing), with skills progressing from interpersonal and presentational speaking to grammatically more comprehensive descriptive and narrative writing. Geographical knowledge is connected to cultural insights. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught almost entirely in German.

Prerequisites: LG 201: Successful completion of LG 102 or equivalent

LG 202: Successful completion of LG 201 or equivalent

**LG301, 302                      Advanced German I & II                      .5 CU/quarter**

In this two-quarter sequence, students are exposed to many different styles of writing including prose (including guided text work on authentic Grimm's fairy tales), poetry, and non-fiction. The sequence rounds out the study of structural complexities of the German language. Written proficiency is developed through compositions that focus on a variety of different writing styles including exposition, persuasion, narration, and description. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught almost entirely in German.

Prerequisites: LG 301: Successful completion of LG 202 or equivalent

LG 302: Successful completion of LG 301 or equivalent

**LG400                      Program Abroad: Germany                      .25 - 1.5 CU/quarter**

This cultural immersion program is designed for qualified students of German. Candidates selected to participate spend the fall quarter in Münster, Germany, attending the prestigious *Gymnasium Paulinum* and residing with a host family. The family of each participant from ASMS simultaneously hosts an exchange student from Münster. Although exchange students from Münster reside at ASMS for the duration of the program, ASMS host families enjoy time with their exchange student during official school breaks and other planned activities that contribute to a better understanding of life in the United States. Interested students should consult with their instructor to determine qualification. Interested parties should also consult the school-owned *One Drive German Exchange Notebook*. Qualified students are required to submit an application to the program director during fall quarter.

Prerequisites: Permission of the program director.

Elective credit for up to 1.5 CU will be determined upon return by the program director.

**LG401, 402, 403      Fourth Year German I, II & III      .5 CU/quarter**

This three-quarter sequence offers more in-depth guided exploration of German literature, film and media, and culture. Cultural, historical or literary topics brought to light through a variety of materials are examined through class discussions and written compositions. The particular content focus is adaptable to the strengths and goals of each year's learner group and may not be replicated identically the following year. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught entirely in German.

Prerequisites: LG 401: Successful completion of LG 302 or equivalent

LG 402: Successful completion of LG 401 or equivalent

LG 403: Successful completion of LG 402 or equivalent

**LG501, 502, 503      Directed Reading in German      .25 – 1.5 CU/quarter**

This Directed Reading is intended primarily for German students who have completed the Fourth Year German sequence and would like to continue studying German more independently. The topic and content will be determined jointly by the instructor and individual student(s) and could focus on current events, business German, post-WWII literature, Kafka or various other areas of study. Emphasis is placed on developing oral and written proficiency through self-guided reading, writing, and discussions in German. This Directed Reading is taught entirely in German, and may not be offered every quarter or every year. Prerequisites: Successful completion of LG 403 or equivalent

**LS101, 102      Beginning Spanish 1/2 - 2/2      .5 CU/quarter**

Emphasis in this two-quarter sequence is placed on the acquisition of basic language skills: oral and aural skills, reading, and writing. Level appropriate cultural topics are presented throughout the term. Students acquire basic vocabulary and learn grammatical constructions necessary for essential communication. Coursework includes a variety of extensive online components.

LS 101 Prerequisite: None LS 102 Prerequisite: Successful completion of LS 101; demonstrated comparable competence; or permission of the department.

**LS201, 202      Intermediate Spanish 1/2 - 2/2      .5 CU/quarter**

Further develops listening, speaking, reading and writing skills, enabling students to successfully communicate in everyday situations (e.g. narrating present, past and future activities). Cultural topics are presented throughout the term. Coursework includes a variety of extensive online components.

Prerequisite: Successful completion of LS102; demonstrated comparable competence; or permission of the department.



**LS301, LS302      Advanced Spanish 1/2 – 2/2      .5 CU/quarter**

In this two-quarter sequence, students are exposed to many different styles of writing including prose, poetry, and non-fiction. Written proficiency is developed through compositions that focus on a variety of different writing styles including exposition, persuasion, narration, and description, and which solidify the grasp of more complex Spanish grammar skills. An emphasis is placed on presentational speaking and increased class discussion. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught almost entirely in Spanish.

Prerequisites: LS 301: Successful completion of LS 202 or equivalent

LS 302: Successful completion of LF 301 or equivalent

**LS401, LS402, 403      Fourth Year Spanish I, II, III      .5 CU/quarter**

This three-quarter sequence offers more in-depth guided exploration of Spanish language literature and culture. Cultural, historical or literary topics brought to light through a variety of materials are examined through class discussions and written compositions. Written proficiency is developed through a comprehensive review of Spanish grammar. The particular content focus is adaptable to the strengths and goals of each year's learner group and may not be replicated identically the following year. A communicative, task-based approach to language instruction is adopted in which students engage in communicative activities that require the exchange of real-world information with the goal of developing oral proficiency in the target language. This course is taught entirely in Spanish.

Prerequisites: LS 401: Successful completion of LS 302 or equivalent

LS 402: Successful completion of LS 401 or equivalent

LS 403: Successful completion of LS 402 or equivalent

**LS460, 461, 462      Advanced Spanish Reading and Writing      .25 - .5 CU/quarter**

The course allows students to develop their writing and presentational skills through reading and interpreting a variety of texts ranging from authentic online news journals, historical, cultural and literary readings as a means of developing critical thinking. Highly recommended for seniors who have completed the fourth year sequence in their junior year and who wish to strengthen previously acquired skills before graduating. This course may not be offered every term and is subject to joint agreement between teacher and student. Prerequisite: Successful completion of LS 403 or demonstrated comparable competence.

**LS400****Program Abroad: Spain****.25 - 1.5 CU/quarter**

This cultural immersion program is designed for qualified students of Spanish. Participants visit Seville, Spain during the fall quarter, residing with a host family. They attend classes at the prestigious Colegio Europa, while enjoying the culture of Seville in the company of their hosts and Spanish classmates. Seville counterparts attend ASMS, while residing at ASMS. American host families enjoy time with their “host” child during school breaks and other planned activities that would enhance the student’s cultural understanding of life in the US. Qualified and interested students should submit an application to the program’s director at the beginning of the school year. Prerequisite: Permission of the program’s sponsor. Elective credit for up to 1.5 credits will be determined upon return by sponsor.

## **History**

### **HS100 Human Geography .5 CU**

Human Geography is an historical and systematic study of patterns and processes that have shaped human understanding, use, and alteration of the earth. Students learn to employ spatial concepts and landscape analysis to examine past and present human social organization, migration patterns, demographics, geo-political considerations, economic and urban development as well as human impact on the environment. This class will use current GIS applications allowing students to learn the current methods and tools of professional geographers. Required for Sophomores.

### **HS101 Advanced American Studies 1 .5 CU**

This course includes the political, socio-cultural, and economic factors in the development of America as a nation from European colonial settlements to the end of the Civil War. The course will focus on the changing aspirations and behavior of ordinary Americans as well as the transformative achievements of the powerful and famous. The objective is to understand not only what happened, but also why it happened. The course will allow students to analyze critically the significance of race, ethnicity, religion, class, and gender in the American Experience and prepare students to make their own judgments about the relative importance of different factors in shaping the American past. Prerequisites: none.

### **HS102 Advanced American Studies 2 .5 CU**

This course includes the political, socio-cultural, and economic factors in the development of America as a nation from Reconstruction to the present day. The course will focus on the changing aspirations and behavior of ordinary Americans as well as the transformative achievements of the powerful and famous. The objective is to understand not only what happened, but also why it happened. The course will allow students to analyze the significance of race, ethnicity, religion, class, and gender in the American Experience and prepare students to make their own judgments about the relative importance of different factors in shaping the American experience. Prerequisites: HS101.

**HS103**                      **Western Thought II**                      **.5 CU**

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This course in Western thought explores the relationship between man and the natural world. From the philosophers of antiquity to today's historians of ecology, the physical environment has been for humankind many things: a retreat from the stresses of urban life, a landscape to paint, a habitat to modify and a precious resource to protect. It has inspired composers but has also been used to validate certain political ideologies. Through the centuries civilized man has widened the distance between himself and the natural world but has never wanted to be disconnected from it entirely, for he as a human being is organically and spiritually connected to it. This class takes a chronological view at man's changing attitudes and behavior towards nature and the living creatures found within it. Class texts are primary sources which encompass everything from pre-Christian sacred groves and temples to personal journals, religious writings, medieval bestiaries, Renaissance gardens, paintings, scientific treatises and our own national parks. Lecture and discussion, group activities. Published digital scrapbook is final project. Prerequisites: HS100.

**HS107**                      **The American West**                      **.5 CU**

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This course covers the history of the American West, from European contact through the late 20th century, with focus on the 19th and 20th centuries. The course will explore the myths that impelled countless Americans from all walks of life to join in westward expansion. More importantly, we will study the variety of myths produced by the experience of westward expansion, including stories of pony express riders, social bandits, Indian fighters, schoolmarm, prostitutes, homesteaders, railroad barons, and so forth. We will contrast this mythology against the backdrop of the "reality" of Western history by looking at the lives of "neglected people" who settled the West (such as women and minorities), the genocidal destruction of Native American societies, and the role of big businesses and capitalism in Westward expansion. Prerequisites: HS101.

**HS109**                      **History of the Church**                      **.5 CU**

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Students study the early history of the Christian Church, including the development of church leadership, famous quarrels concerning the nature of Christ, the role of the Church Fathers, the canon of the Bible. Prerequisites: none.

**HS110**                      **History of Religion: Ancient Faith and Philosophy**                      **.5 CU**

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A course on the history of the beliefs about the afterlife in the ancient and medieval worlds: heaven, hell, purgatory, limbo. It explains different understandings and outlooks, from Egypt, the Jews, the Christians, the Persians, the Arabs. Prerequisites: none.

**HS111**                      **Biblical Literature**                      **.5 CU**

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This course examines the historical development and the texts of selected biblical themes and the Bible books themselves. Examples of the books selected are Judges and Daniel, in the Old Testament and Mark and Luke in the New Testament. Prerequisites: none.

**HS114      Special Topics in World History: The Modern Middle East      .5 CU**

This course studies the emergence of the Middle East in the modern period, roughly from the late eighteenth century to the present. It begins with state-building as structured by European powers during the post WWI period and traces political change and ideological trends in the region with an eye to better understanding political relationships that have developed both within and external to the region. Topics covered will be nationalism and independence; the Arab-Israeli Conflict and the quest for peace in the Middle East, the Saudi-U.S. relationship, America's relationship with Israel, the Iranian Revolution and Islamic fundamentalism, as well as the politics of oil. Special attention will be given to how the Cold War, Afghanistan, the Persian Gulf War, the Iraq War and the War on Terror have shaped today's Middle East, politically, economically, and socially. Prerequisites: AASI and II.

**HS115      Egyptology      .5 CU**

Students study ancient Egypt's history and religion, including great monuments like the pyramids and the sphinx, as well as the whole phenomenon of mummies ("up close" in modern research on surviving mummies), rulers including Khufu, Tut and Cleopatra. Prerequisites: none.

**HS116      The Romantic Era in Europe and America      .5 CU**

An interdisciplinary study of American and Anglo-European society and culture from 1770-1850, this course explores some of the great works of art, music and literature of the Western world in the context of the economic, social and political changes of the same period. The geographical focus is on France, Germany, England and America, which are bound together by ideas, values and leitmotifs characteristic of America and Western Europe in the nineteenth century: rebellion, individualism, celebration of the common man, nostalgia for the past, a desire to connect with the natural world, and a utopian search for an ideal life that seems forever lost to cities and factories.. How these motifs and interests emerge from western societies that are urbanizing, industrializing, developing consumer cultures and a sense of national identity makes this course one that illustrates the connection between art and life but also the strands of thought that connect American and Europe. Prerequisites: HS101.

**HS119      Early Middle Ages      .5 CU**

Students study the "fall of Rome" (how it both did and did not happen), the rise of the authority of the Popes in the Church, the cult of martyrs and saints, the identity of Franks, Goths, and other "barbarians." Prerequisites: none.

**HS120      Roman Civilization      .5 CU**

The course explores Roman history and civilization from the early background through selected areas of emphasis , for example, the "twelve Caesars," the whole "gladiator thing," the War with Hannibal (and his elephants), Vestal Virgins, chariots in the circus races, the incredible third century, etc. Prerequisites: none.

**HS121 History of Religion: Comparative Religions .5 CU**

As the title indicates, this is an introduction to the comparison of world religions, including Judaism, Christianity, Islam, Hinduism, Greek and Roman religions. Respect is shown to all. Prerequisites: none.

**HS201 Economics .5 CU**

This course reviews topics in both microeconomics and macroeconomics with emphasis on the pervasive debate between the free market and government intervention. Topics to be covered include Classical economic theory, Keynesian economic theory, demand and supply, fiscal policy, monetary policy, income inequality and international trade. This course will prepare students to study economics at a more comprehensive level in college. Prerequisites: senior standing.

**HS202 Advanced American Government .5 CU**

This course introduces the history, general principles, policies, and problems of national government in the United States. The course will also examine the fundamentals of American democracy, including the Constitution, the nature of federalism, and the institutions and processes of the executive, legislative, and judicial branches of government. The role of public opinion, the media, and the participation of interest groups, social movements, and political parties in the U.S. political system are also emphasized. Prerequisites: senior standing.

**HS205 American Minority Relations .5 CU**

This course is a cultural and historical study of selected minority groups in terms of their social, political, and economic relationship to contemporary American society. The course will explore the psychological and sociological framework of minority / dominant group interaction patterns, and discuss the origins and causes of prejudice and discrimination. Issues explored in this course include: racial profiling, affirmative action, African American slavery reparations, bilingual education, immigration laws, reverse discrimination, the significance and place of the "N" word and other racial and cultural epithets in our society, sexual harassment, and homophobia and misogyny in popular culture. Prerequisites: HS101.

**HS206 APC( American Popular Culture): A Social History of Rock and Roll .5 CU**

This course presents a study of the history of Rock and Roll in the context of the history of America during the mid to late twentieth century. The evolution of Rock and Roll and the many influences of that evolution will be examined against the backdrop of historical and social issues from post-World War II America to the end of the Cold War. Historical influences such as the Civil Rights movement, the Vietnam War, the countercultural movement, Watergate, and the Reagan era will be examined for their connection to Rock and Roll and popular culture. Prerequisites: junior or above standing or HS101.

**HS207                      APC ( American Popular Culture): Heroes and History                      .5 CU**

This team-taught course in American Popular Culture is a study of comic books as a medium of communicating American cultural beliefs, ideas and values. Comic books reflect the changing interests of the creative teams that produce them but they also reflect changes in American society, politics, and the way Americans perceive the world. Originating in the 20th century, comic book characters and storylines reveal the hopes and fears of American citizens as much as they convey a strong sense of national identity and national purpose. In this class, comic book superheroes become a window into the crime of the 1930s, the adversaries America faced in World War II, the fear of Communism, increasing doubts as to whether government can protect us and the ways in which America changed as a people and society after the events of 9/11.

Prerequisites: none.

**HS208                      Post-1945 U.S. and the World                      .5 CU**

This course entails study of pivotal events in the history of United States foreign policy since World War II. It particularly examines America's relationship with the larger world with an eye to better understanding today's political conflicts and issues. Selected areas of study will include the Cold War, the Vietnam War, Nixon and Detente, American Foreign Policy during the Carter and Reagan Administrations and America's post Cold War relationships with the newly emerging power centers of China and the European Union. An excellent elective for those students who wish a better understanding of America's global role and national policy in the late 20th Century. Prerequisites: HS102.

**HS209                      African American History                      .5 CU**

This course explores the major themes in African American history, from its roots in fifteenth-century West Africa to contemporary U.S. society. Course materials cover the major political, economic, social and cultural factors that have shaped the African and African American experience in the United States.

**HS211                      Terrorism and Violence in the Modern Age                      .5 CU**

This course takes an historical look at the troubling phenomena of genocide, terror, and violence around the world in the twentieth and twenty-first centuries. A number of case studies will be examined to better understand why and how terror has been deliberately employed by political leaders such as Joseph Stalin and Cambodia's Pol Pot to extremist groups like the Ku Klux Klan. Covered will be crimes of war, genocide, state terror, and hate crimes as well as the terrorism associated with extreme religious views both in the United States and abroad. Lecture, discussion and a final project.

Prerequisites: HS102.

**HS214                      Women of the Renaissance                      .5 CU**

Moving away from the traditional survey approach to the field, this course will focus on the Renaissance from a feminist perspective. Did women have a Renaissance? The reality is that most did not, and for the majority of women, the Renaissance was a time when women were both denied equal protection under the law, and held to standards of beauty and behavior overwhelmingly determined and shaped by men. Synonymous with social, economic, and political change, the Renaissance for most women served to reinforce female submissiveness and patriarchal control but surprisingly it is an age that produced the first women artists and a number of powerful female monarchs. In this class, women of the Renaissance will be studied and it is their lives that become our window into this perpetually fascinating period of European history. Seminar with assigned readings and class project. A history elective for those interested in women's studies and the culture of the Renaissance. Prerequisites: none.

**HS 215                      Studies in Empire: Britain and America                      .5 CU**

This course explores the subject of empire and imperialism through the examples of Great Britain and America. The purpose of this course is to explore the social, economic and political dimensions of empire and to consider what have been termed imperial views and policies from the perspective of the colonial or imperial power and the colonized or subjugated people they were directed towards. Emphasis is placed on the nineteenth and early twentieth century which allows study of the British Empire at its height but material will cover the Empire through WWI and the so-called twilight years of decline before colonial empires were dismantled in the decades after WWII. The last weeks of the course will focus on America as an empire in order to compare the two nations as empires. Class discussions will revolve around assigned readings. Individual research project required. Prerequisites: HS102.

**HS216                      A Little Revolution Every Now And Then                      .5 CU**

While peace and stability are always desirable, it is revolutions that largely have created the world as we know it today. The Scientific Revolution of the seventeenth century helped create the political climate that produced England's Glorious Revolution, while the American and French Revolutions of the eighteenth century inspired the many uprisings and nationalist movements of the nineteenth century. In the twentieth century, all of these, as well as the Bolshevik revolution in Russia, became the model for those nations and peoples seeking self-determination and an end to colonial rule. This course will take a closer look at the concept of revolution as a means of bringing social, economic, and political change. This is an elective for those students who desire to know how ideology translates into "realpolitik". Discussion/Lecture plus collaborative learning experiences via group projects. Prerequisites: HS102.



**HS217** **America in the 1950s** **.5 CU**

This course examines the decade of the 1950s in America from a socio-historical perspective. We will analyze the dichotomy of the nostalgic view of the decade as a time of economic prosperity, solid family values, and political and cultural harmony, compared to a revisionist perspective that illuminates the decade's racial tensions, gender stratification, burgeoning countercultural movement, and the genesis of the sexual revolution. Prerequisites: HS102.

**HS218** **America in the 1960's** **.5CU**

This course explores the political, social, and cultural history of 1960s America. The "Sixties" is something of a misnomer. The period was defined less by the borders of a single decade than by movements and issues that emerged in the 1940s and were only partially resolved by the time Richard Nixon resigned the presidency in 1974. There also is no consensus about the era's meaning or significance—the 1960s continue to be the subject of passionate debate and political controversy in the United States. It was, many have said, a time of revolution, but whose revolution and who won? The times they were 'a-changin', but why, how, and to what end? In exploring this turbulent decade, the course examines what did and what did not change in the 1960s. Topics include: the presidencies of John F. Kennedy, Lyndon B. Johnson, and Richard M. Nixon; the triumph and breakdown of postwar liberalism; the resurgence of conservatism; the many insurgent political and social movements of the decade, including the civil rights and Black Power movements, the New Left, environmentalism, the Chicano and Red Power movements, feminism, and the gay liberation movement; the counterculture; the sexual revolution; rock 'n' roll; and the Vietnam war. We will investigate these and other issues in a mix of printed, visual, audio, and multimedia sources such as speeches, correspondence, newspapers and magazines, photographs, television, movies, and music.

**HS220** **History of Religion: Saints East and West** **.5 CU**

An introduction to the meaning of saints or "holy persons" in various backgrounds. Famous saints are selected for up-close study with their historical circumstances, their claims to holiness, etc. Francis of Assisi and Mother Teresa have been featured among Christian saints, and Ali, Buddha, Gandhi, and Shankara have been some of the eastern figures. Prerequisites: none.

**HS226** **History of Religion: Introduction to Islam** **.5 CU**

An introduction to Islam, the Muslim faith and culture. The course includes the biography of Mohammad and an introduction to the Qur'an, the Muslim holy book. It also includes the history of the split between the Sunni and Shia, and the initial Muslim expansion in the Middle East. Prerequisites: none.

**HS227                      America at War                      .5 CU**

This course examines the political, economic, social, and intellectual factors which lead to our long list of colonial, revolutionary, civil, and international wars from 1675 to 2003. The course emphasizes why American/colonials entered the various conflicts, major engagements of the conflict, and the outcomes generated by the conflicts. Strategy, tactics, and technology are major areas of interest. Lectures and student-directed presentations will be supplemented by a research project; drawn from contemporary sources covering public opinion and the impacts that selected conflicts exerted on American society. Prerequisites: HS102 recommended but not required.

**HS228                      Crusades                      .5 CU**

This course will examine the character and causes of “crusades”, both from eastern, Muslim perspectives as well as western, Christian perspectives. It will focus upon the cultural differences of the opposing parties, the leadership, the decision, and the consequences of crusades in general. When it comes to “popular myths”, crusades are one of the most badly misrepresented historical developments; this course should be of real assistance in clarifying the issues. Prerequisites: none.

**HS229                      The New South                      .5 CU**

This course examines the modern South from the end of the Civil Rights movement (Early 1970s) to the present day. Particular emphasis will be placed on contemporary Southern politics, identity, and culture to determine how much has changed and how much has remained bound by tradition. Topics will include economic trends, demographic changes, and the rise of suburbanization, the emergence of the Republican Party’s political dominance, southern neo-conservatism and values as well as re-segregation. This class will be conducted primarily as a seminar and features a number of experiential learning activities, the participation of guest speakers, and a field research project. Prerequisites: HS102.

**HS230      Special Topics in World History: History of Modern China                      .5 CU**

This course explores modern China—its government, society, economy and culture. China is emerging as the economic superpower of the twenty-first century and Americans need to understand the Chinese people and the society as a whole since virtually every sector of American life is influenced by our relationship with this country. This course is for the serious student of history, economics and cultural studies. This class is student-centered, conducted as a college-level seminar with students leading class discussions every week and expected to participate daily in discussion of assigned readings. Prerequisites: HS102.

**HS234 America’s First Ladies (Cross-Reference History/Women’s Studies) .5 CU**

This course introduces students to America’s First Ladies from Martha Washington to Michelle Obama. An academic complement to the U.S. Presidents course, learn how the women of the White House were often the power behind the men. Learn which first ladies smoked and enjoyed a good party and which ones commandeered the men in their lives from husbands to chefs. A fun and interesting way to explore American society and the American woman from the perspective of 1600 Pennsylvania Avenue. Prerequisites: none.

**HS278 The Civil War .5 CU**

This course will examine one of the most pivotal and defining moments in American History: the American Civil War. Grim, brutal, and personal, the Civil War (also called the War Between the States) pitted countrymen against countrymen and claimed more American lives than any other war fought during any time in our nation’s history. Students will study the time period stretching from the Compromise of 1850 to the Presidential election of 1876, as well as the various reasons for the war, the combat, the eventual outcome, and the Reconstruction Period.

**HS279 World War I .5 CU/quarter**

World War I fundamentally changed the world. It forever changed the way we look at warfare, the idea of empire, the significance of alliances, even the value of human life. This course expands on what is typically taught in a survey course to fully explore the politics that led to war on a global scale, acquire in-depth knowledge of the key battles on the Western Front and elsewhere around the globe, to better understand the experience of battle for those that fought in it, especially in the light of the trench warfare that so characterized WWI, to develop greater awareness of the war’s imperial or colonial aspects and finally to consider the consequences of the Great War or its aftermath. Lecture, discussion, student research project. Prerequisites: none.

**HS280 World War II in Global Context .5 CU**

This class on World War II begins with origins of the global conflict and follows the war through both the European and Pacific theatres. It presents the war from an international perspective as much as possible, covering the history and politics of the war in Germany, Japan, and Italy, as well as that of the United States. Major battles, policy decisions, and personalities of the key participants are covered as well as the impact of the war on the home-front. While Germany’s Third Reich is studied, the course does not provide an in-depth study of the Holocaust. Prerequisites: HS102.

**HS300, 301, 302 AP U.S. History****.5 CU/quarter**

The Advanced Placement program in United States History is designed to provide students with the analytical skills and factual knowledge necessary to deal critically with the problems and materials of United States history. The course prepares students for intermediate and advanced college courses by making demands upon them equivalent to those made by full-year introductory college survey courses. In this pursuit, the acquisition of factual knowledge is the beginning point of the process, not the end. Students will learn to interpret and evaluate the relative significance of primary and secondary source material, and to present their evidence and conclusions clearly and persuasively in an essay format. The course will focus on the changing aspirations and behavior of ordinary Americans as well as the transformative achievements of the powerful and famous. The objective is to understand not only what happened, but also why it happened. The course will allow students to analyze critically the significance of race, ethnicity, religion, class, and gender in the American Experience and prepare students to make their own judgments about the relative importance of different factors in shaping the American past. Prerequisites: HS101 and permission of instructor.

## Mathematics

**MA061**                                      **Geometry 1/2**                                      **.5 CU**

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Geometry I is an introduction to Euclidean Geometry, including the nature of reasoning and proof involved in the study of geometry. Topics covered include congruent and similar figures, parallel lines, and planes, plus an introduction to the study of area, volumes and transformations involving both investigations and deductive proof. Prerequisite: none.

**MA062**                                      **Geometry 2/2**                                      **.5 CU**

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Geometry II involves Euclidean Geometry of the circle and associated concurrence theorems, the study of analytic geometry of the various conic sections, and an investigative approach to the study of elementary topology, fractal geometry and non-Euclidean geometry. Prerequisite: MA061.

**MA100**                                      **Intermediate Algebra**                                      **.5 CU**

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This course introduces algebra topics such as polynomials, factoring, exponents and radicals, linear and quadratic equations, functions, graphs, systems of equations, and applications. The course prepares students for Accelerated Algebra. Prerequisite: none.

**MA101**                                      **Accelerated Algebra**                                      **.5 CU**

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Accelerated Algebra covers, in greater depth, many of the topics that are introduced in Intermediate Algebra. Additional topics covered include complex numbers, quadratic and rational inequalities, and inverse functions. The course is equivalent to a typical college algebra course. Prerequisite: MA100 or equivalent score on math placement test.

**MA103**                                      **Trigonometry**                                      **.5 CU**

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Trigonometry studies trigonometric functions, inverse trigonometric functions, graphs, identities, vectors, complex number representations, solving triangles and trigonometric equations, and applications. Prerequisite: MA101 or equivalent score on math placement test. The course must be completed by the end of the junior year.

**MA104**                                      **Precalculus**                                      **.5 CU**

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Precalculus is a survey of topics necessary for calculus, including polynomials, rational, exponential and logarithmic functions, matrices, sequences and series, and the binomial theorem. Prerequisite: MA101 or equivalent score on math placement test.

**MA200** **Problem Solving** **.25 CU**

The Problem Solving Seminar/Mathematics Circle is designed to teach mathematics as a thinking tool more than as a computational tool. As such it will benefit students, whose studies lead them into any problem solving discipline, including fields as far removed from mathematics as economics, chemistry, engineering, or even business. The mission of the Problem Solving/ Mathematics Circle/Math Team Preparation is to introduce students to mathematics as a creative thinking tool through problem solving. Prerequisites: none.

**MA201** **Differential Calculus** **.5 CU**

This introduction to the theory, techniques, and applications of differential calculus includes functions, limits, derivatives, related rates, maximum/minimum problems, and curve sketching, derivatives related to exponential, logarithmic, trigonometric and inverse trigonometric functions. Prerequisites: 'B' or better in both MA103 and MA104 or permission of the department.

**MA202** **Integral Calculus** **.5 CU**

This introduction to the theory, techniques, and applications of integral calculus includes indefinite and definite integrals, area, volume, work, fluid force, integrals related to exponential, logarithmic, trigonometric and inverse trigonometric functions, and integration techniques. Prerequisite: 'B' or better in MA201 or permission of the department. NOTE: Students who plan to take the AP Calculus AB exam should complete MA201 and MA202.

**MA203** **BC Calculus** **.5 CU**

BC Calculus studies a variety of calculus topics including infinite sequences and series, and parametric and polar equations. Other topics might include conic sections, introduction to differential equations and hyperbolic functions. Prerequisite: 'B' or better in MA202 or permission of the department. NOTE: Students who plan to take the AP Calculus BC exam should complete the calculus sequence through MA203.

**MA205** **Introduction to Statistics** **.5 CU**

This course focuses on the statistical methods and reasoning, which are used in the natural and social sciences. Topics include: organizing, classifying, and comparing data; probability distributions, sampling distributions, estimation and hypothesis testing. Prerequisite: MA104.

**MA206** **Discrete Mathematics** **.5 CU**

This course studies the mathematical elements of computer science including propositional logic, predicate logic, sets, functions and relations, combinatorics, mathematical induction, recursion, algorithms, matrices, graphs, trees, and Boolean logic. Prerequisite: Precalculus MA104.

**MA207                      Visual Mathematics                      .5 CU**

This hands-on course emphasizes visual problem solving and teaches students how to research and write about the intersection of mathematics and the visual arts. Topics vary by term and may include but are not limited to: fractal geometry, linear perspective, tiling and tessellations, symmetry groups, knot theory, modular origami, compass and straightedge constructions, and classification of surfaces. Prerequisite: MA104.

**MA301    Multivariable Calculus I: Vector Functions and Partial Derivatives    .5 CU**

This is the first half of a university-level course in multivariable calculus. This course includes the theory and application of vector functions and partial derivatives. Topics include: Vectors and the geometry of space, Vector-valued functions, Continuity and differentiability of functions of several variables, Gradients and directional derivatives, Extrema of functions of two variables, Lagrange multipliers. Prerequisite: 'B' or better in MA202 or permission of the department.

**MA302    Multivariable Calculus II: Multiple Integrals and Vector Fields    .5 CU**

This is the second half of a university-level course in multivariable calculus. This course includes the theory and application of multiple integrals and vector fields. Topics include: Multiple integrals, Jacobian and change of variables, Line and surface integrals, Green's Theorem, Stoke's Theorem, Divergence Theorem. Prerequisite: 'B' or better in MA301 or permission of the department.

**MA306                      Group Theory                      .5 CU**

This course is an introduction to group theory. Topics include groups, subgroups, finite groups, cyclic groups, permutation groups, and isomorphism. Prerequisite: MA104.

**MA307                      Topology                      .5 CU**

Topology is the study of surfaces in space and certain properties of those surfaces that remain unchanged under deformation. Students will learn proof techniques in point-set topology, learn how to classify surfaces based on genus, Euler characteristic, and other methods of geometric topology, and study topics in algebraic topology such as homeomorphism and homotopy. Because this course is proof-intensive, BC Calculus or Counting & Probability are recommended prior to enrollment, although not required. Prerequisites: "A" in Precalculus or permission of the instructor.

**MA334 & MA335    Introductory Real Analysis I & II    .5CU**

This course is designed to provide students with the theoretical context of concepts encountered in the Calculus sequence. Topics include sequences and series of real numbers, suprema and infima, Cauchy sequences, open sets and accumulation points in Euclidean space, completeness, compactness, connectedness, continuity, Intermediate Value Theorem, differentiation of functions of one variable, integration of functions of one variable, pointwise and uniform convergence, Mean Value Theorem, Taylor's Theorem, Inverse Function Theorem, Implicit Function Theorem. Prerequisites: "A" in both MA201 Differential Calculus and MA202 Integral Calculus or permission of the instructor

**MA360                      History of Mathematics                      .5CU**

Historical survey of the general development of mathematics with a balance of historical perspective and mathematical structure. This course features a significant writing component. Prerequisite: Differential Calculus or permission of the instructor. (Fulfills graduation requirement)

**MA401                      Differential Equations                      .5 CU**

Differential Equations introduces the theory, techniques, and applications of ordinary differential equations. Topics include first and second order differential equations, linear equations of higher order, systems of differential equations, numerical methods, Laplace transform methods, and applications. Prerequisite: 'B' or better in MA202 or permission of the department.

**MA402                      Linear Algebra                      .5 CU**

Linear Algebra studies the theory, techniques, and applications of linear algebra including systems of linear equations, matrices, determinants, vectors, vector spaces, and eigenvalues/eigenvectors. Prerequisite: 'B' or better in MA201 or permission of the department.

**MA403                      Complex Analysis                      .5 CU**

This course is an introduction to the analysis of complex functions. Topics covered: arithmetic of complex numbers; regions in the complex plane; limits, continuity, and derivatives of complex functions; elementary complex functions; mappings by elementary functions; contour integration; power series; Taylor series; Laurent series; calculus or residues; conformal representation; applications. Prerequisite: 'B' or better in MA202 or permission of the department.

**MA404                      Number Theory                      .5 CU**

This course is an introduction to classical number theory with a balance of theory and computation. Topics include mathematics induction, divisibility properties, and properties of prime numbers, the theory to congruencies, number theoretic functions, and continued fractions. Prerequisite: MA104.



**MA405 Numerical Mathematics .5 CU**

This course is an investigation of methods of numerical computation with an emphasis on application of numerical approximation techniques in the solution of problems frequently encountered in engineering and science. Topics will include error analysis, solutions of equations, interpolation, quadrature, and linear systems. Prerequisite: MA202.

**MA407 Counting & Probability I .5 CU**

Topics covered include: Basic counting and probability techniques, Inclusion-exclusion, 1-1 correspondences, Pigeonhole Principle, Constructive expectation, Fibonacci and Catalan numbers, Recursion, Conditional probability, Generating functions, Graph theory. Prerequisite: MA104.

**MA408 Counting & Probability II .5 CU**

In this class students will continue their exploration of more advanced counting and probability topics. This class is the follow-up to Counting and Probability I. Topics include inclusion-exclusion, 1-1 correspondences, the Pigeonhole Principle, constructive expectation, Fibonacci and Catalan numbers, recursion, conditional probability, generating functions, graph theory, and much more. The class is structured to inspire the students to explore and develop new ideas. Important counting and probability techniques and powerful problem solving approaches are taught throughout the class. Prerequisite: MA104

**MA410 AP Calculus Review .5 CU**

This course will focus on preparation for the AP Calculus exam. Prerequisite: students who plan to take the AP Calculus AB exam should complete MA201 and MA202; students who plan to take the AP Calculus BC exam should complete the calculus sequence through MA203.

**MA420 AP Statistics Review .5CU/quarter**

This course follows the AP Statistics curriculum set by the College Board and is designed to prepare students for the AP Statistics exam. The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students will learn how to use graphing calculators and read computer output in an effort to enhance the development of statistical understanding. During this course, the student will be exposed to four broad conceptual themes and will be expected to demonstrate proficiency in: Exploring data: describing patterns and departures from patterns; Sampling and experimentation: planning and conducting a study; Anticipating patterns: exploring random phenomena using probability and simulation; Statistical inference: estimating population parameters and testing hypotheses. Prerequisites: MA205 or Permission by the Math Department.

## Physical Education

The following technology components are used in the physical education department: YouTube.com, DDR (Dance Dance Revolution), Nintendo Wii, Wireless Applications Analysis, PowerPoint Presentations, Video Analysis, Heart Rate Analysis, Google docs, and iPhone Applications.

### PE090 Health .5 CU

This course is designed to promote healthy lifestyles through an understanding of disease prevention, fitness concepts, stress management, human sexuality, substance abuse, nutrition, and mental health. This course does not fulfill any physical education requirements. Prerequisites: none.

### PE100 Individual Sports and Games .5 CU

This course is designed to help the student build a basic understanding and participate in sports and games that are performed as an individual or in a small group. Sports and games include, but are not limited to, archery, cup staking, table tennis, line dancing, fitness boxing, disc games, corn hole, horseshoes, table tennis, walking/jogging, and weight training. Prerequisites: none.

### PE101 Archery .5 CU

The course is designed to teach the fundamental skills and knowledge of archery. Emphasis is placed on learning through the higher level thinking processes of analysis, synthesis and evaluation. Prerequisites: none.

### PE102 Badminton .5 CU

This course is designed to provide a basic understanding of the rules, strategies and terminology of badminton, to provide the opportunity for practice of the fundamental skills of badminton, and to develop badminton as a lifetime sport. Prerequisites: none.

### PE103 Pep Squad and Cheerleading .5 CU

This course is designed to help the student learn the fundamentals of cheer, dance, leadership, school spirit, and performance. Performance at school athletic events and campus functions will be required. Prerequisites: none.

### PE104 Bowling .5 CU

The course is designed to teach the fundamental skills and knowledge of bowling. Additional learning opportunities include bowling concepts and strategies, as well as participation in a competitive tournament. Prerequisites: none.

**PE105** **Fitness & Conditioning for Life** **.5 CU**

The class is a combination of fitness, conditioning and circuit training that utilizes cardiovascular activities and emphasizes an understanding of the components of fitness. Prerequisites: none.

**PE106** **Beginning Swimming** **.5 CU**

In this course, students are taught to be comfortable in the water and the basics of swimming to improve their skill level. This would include gradual water adaption, learning to swim and to be safe in, on, or around water. Prerequisites: none.

**PE108** **Swimming** **.5 CU**

This course is designed to help students gain a proper understanding of the correct form that is used when swimming. The strokes that will be performed are freestyle, breast stroke, back stroke, butterfly, and the side stroke. Students will also become knowledgeable about the different kinds of swimming equipment and how they are used. Prerequisites: Students should be familiar with the basics of swimming and swim goggles are needed.

**PE109** **Sports Conditioning** **.5 CU**

This course is designed to help the student prepare for the upcoming sports season. Participation will improve their balance, strength, agility and speed. The student will explore a variety of topics including but not limited to basic anatomy, sports nutrition, hydration, aerobic conditioning, agility, balance, coordination, sports injuries, body weight movements, weight lifting, and sports specific workout design. This course is open to all students. Prerequisites: none.

**PE113** **Table Tennis** **.5 CU**

The course is designed to teach the fundamental skills, strategies and rules of table tennis. Students are given the opportunity to develop a competitive spirit and experience the benefits of table tennis as a lifetime sport. Prerequisites: none.

**PE114** **Tennis** **.5 CU**

The course is designed to teach the basic skills, concepts and rules of tennis. Emphasis is placed on developing a strong foundation and understanding of the mental and physical skills required in tennis. Prerequisites: none.

**PE115** **Volleyball** **.5 CU**

The course is designed to teach basic volleyball skills, rules, and strategies. Emphasis is also placed on officiating and competitive tournament play. Prerequisites: none.

**PE124 Walking and Jogging .5 CU**

This course is designed to aid the student in the understanding and development of cardiovascular fitness through walking and jogging. The student will learn the benefits of aerobic fitness while enhancing their overall health.

**PE125 Weight Training .5 CU**

This course is designed to teach basic weight training techniques to improve strength and fitness levels of students. Emphasis is placed on development of exercise routines, proper physical conditioning methods, an understanding of anatomy and the history of weight training. Prerequisites: none.

**PE126 Gentle Yoga .5 CU**

This course is designed to emphasize stretching and relaxing the mind and body. Students will learn how to relax and relieve stress.

**PE129 Circuit Training .5 CU**

This course is designed to improve the overall fitness of the student. The course will combine cardiovascular training and strength training for a full body challenge.

**PE131 Interval Training .5 CU**

This course is designed to explore and practice interval training. Interval training involves alternating short bursts of intense activity with what is called active recovery.

**PE132 Cardio Fitness Boxing .5 CU**

This course is designed to combine elements of cardio and boxing for a full body workout. Punch, kick and block your way through this fun and challenging class.

**PE200 Varsity Basketball (Women's) .5 CU**

**Varsity Basketball offers students the opportunity to compete** interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, teamwork and fitness. Prerequisites: none.

**PE201 Varsity Basketball (Men's) .5 CU**

Varsity Basketball offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, teamwork and fitness. Prerequisites: none.

**PE202                      Varsity Cross Country (Men's)                      .5 CU**

Varsity cross-country offers students an opportunity to compete interscholastically. Emphasis is placed on endurance training, running skills, strategy, discipline, sportsmanship and teamwork. Prerequisites: none.

**PE203                      Varsity Soccer (Men's)                      .5 CU**

Varsity Soccer offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, teamwork and fitness. Prerequisites: none.

**PE204                      Varsity Soccer (Women's)                      .5 CU**

Varsity Soccer offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, teamwork and fitness. Prerequisites: none.

**PE205                      Varsity Tennis (Men's)                      .5 CU**

Varsity Tennis offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, fitness, discipline and sportsmanship. Prerequisites: none.

**PE206                      Varsity Tennis (Women's)                      .5 CU**

Varsity Tennis offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, group dynamics, task commitment and fitness. Prerequisites: none.

**PE207                      Varsity Volleyball (Women's)                      .5 CU**

Varsity Volleyball offers students the opportunity to compete interscholastically. Emphasis is placed on advanced skills, strategy, discipline, sportsmanship, teamwork and fitness. Prerequisites: none.

**PE212                      Varsity Cross Country (Women's)                      .5 CU**

Varsity cross-country offers students an opportunity to compete interscholastically. Emphasis is placed on endurance training, running skills, strategy, discipline, sportsmanship and teamwork. Prerequisites: none.

**PE215                      Athletic Manager                      .5 CU**

The course is designed to teach the skills and responsibility of athletic management. Prerequisites: none.

**PE216                  Cycling                  .5 CU**

The class is designed to use aerobic and anaerobic work on stationary bicycles as a method of managing weight, reducing stress, and enhancing wellbeing. During certain periods of the workout there will be opportunities to read, watch videos, and participate in lifelong learning while exercising. Emphasis will be placed on topics such as nutrition, exercise prescription and interdisciplinary learning. Prerequisites: none.

**PE123                  Ultimate Frisbee                  .5 CU**

This course is an introduction to the fundamentals of Ultimate Frisbee.

## **Physics**

### **PH090 Introduction to Physics .5 CU**

This course examines basic concepts of energy and force in topics such as planetary motion, geology, nuclear technology, and meteorology. In the Lab, students conduct lab activities to reinforce material from the lecture material. NOTE: This does not satisfy the 1.5 CU of physics required at ASMS. Prerequisites: MA100 or MA101 or passing score on the Algebra placement exam.

### **PH101H, 102H, 103H Honors Physics 1/3 - 2/3 - 3/3 .5 CU/quarter**

In this three-quarter trigonometry-based course, students are introduced to the concepts of mechanics (kinematics, force, momentum, and energy), thermodynamics (buoyancy, fluid motion, heat energy, engines), electromagnetism (electric fields, electric circuits, magnetic fields, and electromagnetic theory), and wave physics (oscillatory systems, sound waves, wave optics, and spectroscopy). This is taught at a level comparable to university courses. Prerequisite: PH090 and MA103. Corequisite with PH101H: MA104 or permission of instructor.

### **PH101AP, 102AP AP Physics 1 1/2 – 2/2 .5 CU/quarter**

In this two-quarter trigonometry-based course, students are introduced to the concepts of mechanics (kinematics, force, momentum, and energy), thermodynamics (buoyancy, fluid motion, heat energy, and engines), wave physics (oscillatory systems and sound waves), and electricity (electric fields and electric circuits). This is taught at a level comparable to university and Advanced Placement courses. Prerequisite: PH090 and MA103. Corequisite: MA104 or permission of instructor.

### **PH103AP, 104AP AP Physics 2 1/2 - 2/2 .5 CU/quarter**

In this two-quarter trigonometry-based course, students are introduced to the concepts of electromagnetism (electric fields, magnetic fields, and electromagnetic theory), wave physics (sound waves, wave optics, and spectroscopy), and atomic and nuclear physics. This is taught at a level comparable to university and Advanced Placement courses. Prerequisite: PH102AP.

### **PH105 Astronomy .5 CU**

This introductory survey course in astronomy covers the motion of the sun, moon, planets, and stars in the sky, lunar and solar eclipses, the tides, and seasons. The historical development of astronomy and astronomical models from the time of the ancient Greeks through Newton is discussed. The properties of solar system bodies are covered, along with current theories of the formation and evolution of the solar system. Finally, the basic properties of the sun and other stars are covered, along with our current understanding of the formation, evolution, and death of stars. Prerequisites: none.

**PH109 Lasers and Holography .5 CU**

Students begin with the wave theory of light. The propagation of waves through homogeneous and inhomogeneous media, theory of holography and its practice, and application of lasers to surgery and other fields are explored. In the lab, practical work in laser techniques and holography are performed by students. This class is not offered every year. Prerequisite: PH101H, PH101AP, or PH201AP, or permission of instructor.

**PH111 Robotics .5 CU**

The ability to successfully work in teams to develop an idea is necessary in the advancement of various scientific technologies. In this course, students will improve their teamwork skills as they work together to build a robot that can successfully compete in the FIRST Tech Robotics Competition. In building this robot, students will be able to apply their scientific and engineering knowledge to analyze and solve various problems that arise during the designing and building processes of the robot. Students will learn to use AutoCAD (a computer-aided designing software), to understand basic Java programming, and to 3D print custom parts for the robot, amongst other skills. Furthermore, students will develop their technical writing and oral presentation skills through reports documenting their progress and through the maintaining of a laboratory notebook. Prerequisite:

**PH201AP, 202AP, 203AP AP Physics C 1/3 - 2/3 - 3/3 .5 CU/quarter**

In this three-quarter calculus-based course, students are introduced to the concepts of mechanics (kinematics, force, momentum, and energy), thermodynamics (buoyancy, fluid motion, heat energy, engines), electromagnetism (electric fields, electric circuits, magnetic fields, and electromagnetic theory), and wave physics (oscillatory systems, sound waves, wave optics, and spectroscopy). This is taught at a level comparable to university and Advanced Placement courses. Prerequisite: PH090 and MA201. Corequisite: MA202.

**PH207 Introduction to 3D Printing .5 CU**

This course covers the emerging technology of 3D printing in Medicine, Electronics, Manufacturing and Engineering. Students will explore 3D printing in each of these fields, doing papers on the current use of this technology. As a practical component, the students will learn how to use CAD software such as Autodesk, Google Sketchup and Makerware to design practical devices. They will then convert these designs to STL files and use 3D printing to create these devices. Scanning technologies will also be used to copy 3D shapes which can then be recreated as solid prints. Prerequisites: None.

**PH208 Mechatronics 1 .5 CU**

This course introduces students to concepts of analogue electronics, electrical motors and machine control. They will be introduced to programming in Processing of the Arduino micro-controller, which will be used for data gathering, motor control and sensors. Prerequisites: none.



**PH209                  Mechanical Engineering                  .5 CU**

The principles of statics and dynamics are essential in the field of mechanical engineering. This course is designed to introduce students to these principles and how they are used in real mechanical structures in preparation for future college courses. Students will be able to use these principles to analyze simplified real world examples of mechanical structures, such as cables, beams, bridges, and machines, to determine conditions for static or dynamic equilibrium. Students will also research and learn more about the field of mechanical engineering and how it differs from other engineering disciplines. Prerequisite: PH090

**PH210                  Mechatronics 2                  .5 CU**

This course continues Mechatronics 1 with the study of digital electronics and the structure of digital systems. Students will be given projects where they will do meaningful embedded system design. Prerequisite: PH208.

**PH220                  Aerodynamics                  .5 CU**

This course analyzes the forces involved in flight applying properties of fluid flow and gas properties. Drag, lift, turbulence will be studied with a mind of how these forces affect flight performance and characteristics. We will study the rocket, fixed wing aircraft and rotary wing aircraft during the term. Flight characteristics will be examined with actual flights and with the school's wind tunnel. Prerequisite: none.

**PH225                  Flight Studies                  .5 CU**

This online/lecture course prepares students to pass the written FAA Pilot Knowledge Test required for private pilot certification. This course covers aerodynamics, aircraft performance, instruments, engines and systems, weight and balance, flight maneuvers, airports, airspace and ATC, navigation, aviation weather, Federal Air Regulations, aeromedical factors and aeronautical decision making. (Fee Required) Prerequisite: PH 090, MA 101, and MA 103.

**PH230                  Nuclear Engineering                  .5 CU**

Nuclear interactions examined. Reactor characteristics and operations discussed in terms of macroscopic cross sections and the six factor formula. Reactor operation and power production described in terms of reactivity. Construction and physics of nuclear weapons discussed. Prerequisites: none.

**PH305                      Astrophysics and Cosmology                      .5 CU**

This course is an introduction to the physical properties of exotic astrophysical objects, and current theories about the nature of the universe and its past and future evolution. Topics from quantum mechanics and the special and general theories of relativity are introduced as needed. Topics covered include the properties, formation, and evolution of white dwarfs, neutron stars, and black holes, and our current theoretical and observational understanding of the past evolution and eventual fate of the universe. This class is not offered every year. Prerequisite: PH101H, PH101AP, or PH201AP, MA201, or permission of instructor.

**PH308                      Quantum and Relativity                      .5 CU**

Einstein's theory of relativity is explored. Students cover the quantum theory of light, particle-wave duality of nature, and quantum mechanics. In the lab historical experiments leading to quantum mechanics and relativity are performed. This class is not offered every year. Prerequisite: PH102AP, or PH202AP, or permission of instructor.

**PH400                      Directed Research                      Variable Credit**

This course involves intensive investigation of scientific instrumentation taken under the auspices of a physics instructor who mentors the student's research. This work customarily involves a variable number of contact hours and will often eventuate in a research paper, detailing the results of the investigation that has been undertaken. Prerequisites: none.

## **Study Options and Special Programs**

### **Directed Reading**

The student undertakes a specified course of study comparable to a regular course under the direct supervision of a faculty member. Credit is elective and may vary, from .25 CU or more.

### **Directed Research**

The student pursues a defined research project on campus under the guidance of a faculty member. Credit is elective and may vary, from .25 CU or more.

*NOTE: A Directed Reading and Directed Research may substitute for an academic class with special approval for seniors, however a Directed Reading or Directed Research may not substitute for a graduation requirement taught here on campus.*

### **Student Orientation**

This seminar style course is a requirement for all ASMS incoming students. A variety of topics, such as study skills, goal setting, communication, and plagiarism, will be discussed over the quarter that will help the student transition into life at ASMS. Successful completion will earn 0.25 CU.

### **Special Projects**

Special Projects is an opportunity to engage in academic, experimental and experiential projects on a variety of topics, under the sponsorship of individual faculty members. The list of topics changes each year and includes a balance of on- and off-campus offerings. The usual duration of a Special Project is five class days but may be longer. Each student must participate in a Special Project each year. Grading is on a pass/fail basis; successful completion will earn .25 CU.

### **Foreign Exchange Programs**

The Alabama School of Mathematics and Science is actively engaged in a German and Spanish exchange program. Students have the opportunity to indicate their interest in such an experience by submitting an official form. Students generally score very well on the respective AP language exams after such an experience abroad. Students who comply with the full exchange rules will be able to earn up to 1.5 CU as general elective credit for the entire quarter spent abroad in our programs.