

# Arkansas School for Mathematics, Sciences, and the Arts

## 2009-2010 Course Catalog



Arkansas School for Mathematics, Sciences, and the Arts  
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# STAFF

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Dean of Residential Affairs  
Outreach Director/Distance Education  
Director of Finance & Administration  
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Academic & College Counselor  
Academic & College Counselor  
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Registrar  
Administrative Assistant to the Director  
Secretary to the Dean of Academic Affairs  
Secretary to the Dean of Residential Affairs  
Secretary to the Residential Life Office  
Recruiting/Admissions Assistant  
Public Relations Specialist  
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Community Developer  
Network Administrator  
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## Additional Teachers

Tom Buth- Health/Physical Education  
Mary Alice Chambers- Band  
Lynn Payette- Choir

# **MATHEMATICS DEPARTMENT**

## **Mathematics Department Preamble**

The National Council of Teachers of Mathematics (NCTM) Standards for School Mathematics call for a shift in emphasis from a curriculum dominated by memorization of isolated facts and procedures to one that emphasizes conceptual understanding, multiple representations and connections, mathematical modeling, mathematical problem solving, technology and alternative assessments. The ASMSA mathematics program is designed to aid students in this transition.

Some of the diversified experiences include alternative assessments such as presentations, group learning, and data collection using technology such as the Calculator Based Lab (CBL), Calculator Based Ranger (CBR), TI Navigator System, and graphing calculators. Further use of technology includes the Internet, Excel, Access, GraphLink, Geometer's Sketchpad, TI-Connect, TI-Interactive, APCD, Algebra/Calculus in Motion, Smartboard, Minitab, Maple, or Graphical Analysis.

The ASMSA Mathematical experience also includes communication through the written word, oral interactions, and electronic media.

The mathematics faculty is available on a regular basis for student tutoring and advising.

## **Research Through Technology (RTT)**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester, Fall

**Prerequisites:** None

**Focus:** Math or Science

RTT is an introductory team-taught course in science research, computer science and mathematics, which develops problem-solving skills using technology. Students have hands-on experiences and practice in the use of mathematics software packages, CBLs, CBRs, programming, graphing calculators and fundamentals of computer systems, Windows, spreadsheets, web pages, and communications packages. Research Through Technology provides interdisciplinary skills needed for report writing, research, statistics, and problem solving. Juniors are required to successfully complete Research Through Technology in the fall of their junior year for graduation.

## **Geometry/Trigonometry**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Equivalent of Algebra I and Algebra II

**Focus:** Math

Geometry/Trigonometry is an integrated study of algebra, geometry, and trigonometry, which prepares the student to proceed to the Finite Mathematics and Introduction to Calculus courses or to the AP AB Calculus course (with permission of the Department Chair). Using an integrated approach, students are able to visualize the relationships between geometry and the real world while experiencing formal geometry topics. Students explore, demonstrate, communicate, and apply knowledge of the properties of geometric shapes and their relationships. Students completing this course are required to take the State's End of Course Examination for Geometry. Geometry/Trigonometry is an entry-level course for Juniors only.

## **Algebra II/Trigonometry**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Equivalent of Algebra I and Geometry

**Focus:** Math

Mathematical communication and modeling is the emphasis of Algebra II/Trigonometry, with extensive time devoted to the development and study of linear, quadratic, exponential, and trigonometric functions. Students learn to use the language of algebra to model and solve real-world problems. Topics of algebra, geometry, and trigonometry are explored using the Rule of Three: topics are approached geometrically, numerically, and symbolically whenever possible. Algebra II/Trigonometry is an entry-level course for Juniors only.

## **Precalculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Algebra II and Geometry

**Focus:** Math

**Concurrent Credit:** UALR MATH1302 College Algebra (1<sup>st</sup> Semester / 3 Hours)

UALR MATH1303 Trigonometry (2<sup>nd</sup> Semester / 3 Hours)

Precalculus is an integrated course of study in mathematics and a prerequisite to Calculus. Emphasis is placed on investigating mathematical models in an effort to expand the connections between numerical, analytical, and graphical representations. An extensive amount of time is devoted to the development of linear, quadratic, polynomial, rational, exponential, logarithmic, and trigonometric functions. Conics, Matrices, and Systems of Equations and Inequalities are investigated. Communication and the use of technology are also central components of this course. *Students enrolled in this course are eligible for concurrent enrollment credit through the University of Arkansas at Fayetteville.*

## **Trigonometry/Advanced Placement AB Calculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Selection by department chair per mathematics placement exam score

**Focus:** Math

Trigonometry/Advanced Placement AB Calculus is a comprehensive study of functions, trigonometry, limits, continuity, curve sketching techniques and applications of differentiation, definite and indefinite integrals, techniques and applications of integration, and integration of logarithmic, exponential, trigonometric, and inverse trigonometric functions. Topics are taught with a graphical, numerical, and algebraic approach. Formal definitions and procedures evolve from the investigation of practical problems. Students completing Trigonometry/AB Calculus are prepared to take the Advanced Placement AB Calculus examination. Trigonometry/Advanced Placement AB Calculus is a junior level course only.

## **Finite Mathematics**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Algebra II and Geometry or Precalculus

**Focus:** Math

Finite Mathematics is a one-semester course designed for students not electing to take an Advanced Placement calculus or higher-level mathematics course their senior year. Finite Mathematics topics include Linear Functions, Systems of Linear Equations and Matrices, Linear Programming, Sets and Probability, Counting Principles and Statistics. Finite Mathematics is a senior level course only.

## **Business Calculus**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester

**Prerequisites:** Finite Mathematics or consent of department chair

**Focus:** Math

**Concurrent Credit:** UALR MATH 1342 Business Calculus (2nd Semester Grade Only / 3 Hours)

Introduction to Calculus is a one-semester survey of calculus course designed to prepare students for College Calculus. Students study calculus in an intuitive yet intellectually satisfying way and study the many applications of calculus to the biological, social, and management sciences. The catalyst for understanding concepts and problem solving is the TI-84 Plus Silver Calculator. Introduction to Calculus is a senior level course only.

## **Advanced Placement AB Calculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Precalculus, Trigonometry or consent of department chair

**Focus:** Math

Advanced Placement AB Calculus is a comprehensive study of functions, limits, continuity, curve sketching techniques and applications of differentiation, definite and indefinite integrals, techniques and applications of integration, numerical integration, and integration of logarithmic, exponential, trigonometric, and inverse trigonometric functions. Topics are taught with a graphical, numerical, and algebraic approach. Formal definitions and procedures evolve from the investigation of practical problems. Students completing AB Calculus are prepared to take the Advanced Placement AB Calculus examination. **A student completing AP AB Calculus may not take AP BC Calculus.**

## **Advanced Placement BC Calculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Precalculus (Grade of A or B for both semesters) or Trigonometry and consent of department chair

**Focus:** Math

Advanced Placement BC Calculus is a comprehensive study of functions, limits, continuity, curve sketching techniques and applications of differentiation, definite and indefinite integrals, techniques and applications of integration including integration by trigonometric substitution, by parts, and partial fractions, and numerical integration, and integration of logarithmic, exponential, trigonometric, and inverse trigonometric functions. In addition, parametrically defined curves, graphs in polar coordinates, derivatives of vector functions, and sequences and series are studied. Topics are taught with a graphical, numerical, and algebraic approach. Students completing this course are prepared to take the Advanced Placement BC Calculus examination. **A student previously completing AP AB Calculus may not take AP BC Calculus.**

## **Differential Equations**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Calculus

**Co-requisites:** Multivariable Calculus or consent of department chair

**Focus:** Math

Differential Equations is an advanced mathematics course introducing the concepts of differential equations as natural consequences of the scientific ideas of exponential growth and oscillatory motion and their solution dependence upon initial conditions, and then looking briefly at nonlinear applications involving the idea of chaotic dynamics. Basic notions of linear operators and of linear algebra are included.

## **Multivariable Calculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Advanced Placement AB Calculus

**Focus:** Math

**Concurrent Credit:** UALR MATH1452 Calculus II (2<sup>nd</sup> Semester Grade Only / 4 Hours)

Multivariable Calculus is a comprehensive study in the more sophisticated topics of Calculus. Topics include, but are not limited to, infinite and finite series, conic sections, parametric equations, polar, cylindrical and spherical coordinates, vectors, vector-valued functions, partial differentiation, and multiple integrals. Topics are taught with a graphical, numerical, and algebraic approach with extensive use of graphing calculators with three-dimensional capabilities. Multivariable Calculus prepares students to take the AP BC Calculus exam.

## **Vector Calculus**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Advanced Placement BC Calculus or consent of department chair

**Focus:** Math

**Concurrent Credit:** UALR MATH2453 Calculus III (2<sup>nd</sup> Semester Grades Only / 4 Hours)

Vector Calculus is designed for those students that have completed an Advanced Placement BC Calculus class. The course begins with a general overview of 2-D Vectors and then an extension to 3-D Vectors. The dot and cross product are building blocks to review such topics as unit tangent & normal vectors, velocity & acceleration, equations of planes, curvature, gradients, and directional derivatives. Partial differentiation and then multiple integrals in various coordinate systems will be revisited. The course then examines Vector fields and Line integrals following with a discussion of Green's Theorem, the Divergence Theorem, and Stokes' Theorem. The course finishes with a study of various types of differential equations. Vector Calculus is offered pending faculty availability and student interest.

## **Advanced Placement Statistics**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Algebra II and Geometry

**Focus:** Math

AP Statistics is a research-based course that introduces students to theoretical and experimental probability, conditional probability, data analysis, random variables and functions, discrete and continuous distributions, sampling, estimation and decision-making. ASMSA AP Statistics incorporates the use of technology, cooperative group problem solving, and writing as a part of concept-oriented instruction and assessment. Students completing AP Statistics are prepared to take the Advanced Placement Statistics examination.

## **Math Modeling**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Algebra II and Geometry

**Focus:** Math

Math Modeling is designed so that students utilize their skills and learn new skills as needed to put a mathematical framework on the world around them. Students work in teams solving problems that initially seem unsolvable. By learning to make reasonable assumptions and approximations they build simple models that can be applied to complex situations. Tools from algebra, geometry, trigonometry, matrix theory, game theory, set theory, and graph theory are used to build representative model systems. Math Modeling students are encouraged to participate in various national modeling competitions.

## **Foundations of Higher Mathematics**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester

**Prerequisites:** Equivalent of Algebra II and Geometry

**Co-requisites:** Precalculus or consent of department chair

**Focus:** Math

**Concurrent Credit:** UALR MATH2310 Discrete Math (3 Hours)

Foundations of Higher Mathematics is a one-semester course designed to teach proof development and logic. This course is intended for the student interested in advanced mathematics, computer science, and logic. The course provides an intensive study of logic and higher levels of mathematical proofs while emphasizing basic skills in abstract algebra.

## **Linear Algebra**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester

**Prerequisites/Co-requisites:** Calculus or consent of department chair

**Focus:** Math

Linear Algebra is a one-semester course designed to teach elementary linear algebra and the application of linear algebra in solving systems of linear equations. Linear Algebra is intended for the student interested in advanced mathematics, either for applications in physics, computer science, or other applied fields, or as an introduction to theoretical mathematics. The course provides an introduction to mathematical proof while emphasizing the applications of linear algebra. The calculator and computer are used to facilitate the work on matrices and systems of linear equations and on any other topics deemed appropriate.

## **Number Theory**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester

**Prerequisites:** Precalculus

**Co-requisites:** Calculus

**Focus:** Math

Number Theory is a course designed to meet the needs of advanced students who are interested in a pure mathematics course. Number Theory topics include, but are not limited to, Chinese Remainder Theorem in the context of solving systems of equations, Diophantine equations in context, Cryptanalysis, the Euler phi function, Fermat's Little Theorem, and special primes, i.e., Fermat and Mersenne primes. Students often have their first true experience with proof. Number Theory is offered pending faculty availability and student interest.

## **Topics in Pure Mathematics**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Year

**Prerequisites:** None

**Co-requisites:** Consent of department chair

**Focus:** Math

Topics in Pure Mathematics is designed to help students refine the skills needed to study mathematics at a higher level. Students work on challenging problems from a wide variety of mathematical fields and examine the connections between the different categories of mathematics. The primary purpose of this course is to develop an appreciation for mathematics. A secondary purpose is to prepare students for standardized tests such as the ACT and SAT, and for competitive examinations such as the AMC-12 and the AIME exams. This course does not fulfill the semester mathematics course requirement nor can it be used as a mathematics focus credit. Topics in Pure Mathematics is a Senior level course only.

## **Advanced Geometry**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester

**Prerequisites:** Geometry and Consent of instructor

**Focus:** Math

Advanced Geometry is a one-semester course designed to help students develop an understanding of the basic concepts of differential geometry (Euclidean and non-Euclidean), to discover the connections between the geometry and topology of surfaces, and to provide an introduction to knot theory. This course emphasizes a visual and intuitive comprehension of the topics presented, although time is spent developing ideas more formally. Real-world applications of geometric concepts, as well as uses of geometry in other fields of mathematics, are also explored.

## **Applied Computational Science**

**Credit:**  $\frac{1}{2}$  Math or Science

**Length:** 1 Semester offered in Fall and Spring Semesters

**Prerequisites:** One Semester Programming or consent of instructor

**Focus:** Math or Computer Science

This course integrates problem solving through programming in mathematics, the sciences, and computer science. It is team taught by a Mathematics faculty member and a Computer Science faculty member. Students will solve various problems by writing computer programs. Problems will be drawn from interesting math and science topics. This is a one semester course offered both fall and spring. **This course will not be offered for the 2009-2010 school year.**

## **Introduction to Category Theory**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester offered in Fall Semester

**Prerequisites:** Fundamentals of Mathematics or consent of instructor

**Focus:** Math

This course will introduce students to the abstract concept of sets, which revolutionized mathematics by stripping away all but the necessary properties that would classify a mathematical object. The concept of sets with properties soon led to the idea of categories, and created a link between distinct mathematical fields which had previously had little intersection. Students will study group theory, topology and some well-known functors, such as the Fundamental Group and Homologies.

## **Category Theory II: Functors, Duals, and Directed Systems**

**Credit:**  $\frac{1}{2}$

**Length:** 1 Semester offered in Spring Semester

**Prerequisites:** Category Theory I

**Focus:** Math

The first semester of Categories will arrive at the definition of Functor, but not be able to study categories in depth. This course would be a continuation of the first semester for those students who are willing to continue. Students will explore the definitions and examples of free products, co-products and universal objects. Many examples of covariant and contravariant functors will be studied, including Galois extensions, homologies, and dual categories, and function fields.

## **Applied Complex Analysis**

**Credit:**  $\frac{1}{2}$

**Length:** 1 semester offered in the Spring Semester

**Prerequisites:** Concurrent Enrollment in Calculus or Higher

**Focus:** Math

Students are offered a brief glimpse of the study of complex numbers in Algebra II and Pre-Calculus, but even this is limited to the definition of a complex number, addition, multiplication and conjugates purely for the purpose of introducing the Fundamental Theorem of Algebra. There are, however, some interesting geometric properties of complex numbers that range from complex multiplication, DeMoivre's Theorem, to complex integration, Cauchy's Theorem and Integral Formula. It would also be beneficial for the students to see some real-world applications of complex numbers, and derivatives.

## **Additional Courses Offered by Request**

History of Mathematics

Art of Mathematics

Introduction to Probability

## **SCIENCE & COMPUTER SCIENCE DEPARTMENT**

The objectives of the lab science division of the department are teaching the fundamental principles of science, teaching about science research, and connecting science to the humanities and everyday life. To meet this first objective, the science department offers a wide variety of courses in physics, chemistry, biology, and multi-disciplinary topics. They range from introductory classes to college-level courses. We have Advanced Placement (AP) courses in all three disciplines and many courses that are beyond the AP level such as Genetics, Optics, and Immunology. Many of the courses are eligible for concurrent enrollment credit. The second objective is met by the required research project for all ASMSA students and by advanced lab activities in all our courses. An excellent inventory of equipment is available to support these activities. To meet the third objective, we offer a wide range of team-taught, multi-disciplinary courses. The department works closely with humanities instructors to offer courses that combine physics with music, art with chemistry, and photography with chemistry. We also teach a course that combines physics with human physiology and one in environmental science.

The computer science division focuses on preparing students for university studies in computing-related fields and on teaching essential computing skills to students not intending a career in the field. ASMSA offers course work that follows curriculum recommendations for high schools as well as college level computing studies as proposed by a joint task force of the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers. Programming courses are offered in the Java, BASIC, PHP, and C++ languages. We also offer courses in networking, the Oracle database management system, ethics and technology. An introductory course in computer logic and mathematics is also taught. Our Oracle course can be used as the first step towards certification as an Oracle Professional and several other courses are eligible for concurrent enrollment credit. Extracurricular activities available to students include Collegiate Programming Contests, High School Programming Contest, Botball Robotics Contest, Math Modeling, and a Student Chapter of the Association for Computing Machinery.

### **• GENERAL SCIENCE AND ENGINEERING**

#### **Junior Fundamentals in Research Methods (Jr. FIRM)**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** None

During the spring semester, Juniors are required to choose from a list of faculty-proposed Science Fair projects or propose one of their own. The students are then interviewed for the projects that they have chosen. If the faculty member believes the student to be compatible, they are then assigned to that faculty member. FIRM will not count toward a science focus but will be figured into the GPA for General Science courses taken at ASMSA. FIRM is designed to teach students about the research process and to apply that process to their own project. All research projects are chosen from one of the following categories: behavioral and social sciences, biochemistry, botany, chemistry, computer science, earth and space sciences, engineering, environmental science, mathematics, medicine and health, microbiology, physics and zoology.

## **Senior Fundamentals in Research Methods (Sr. FIRM)**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Jr. FIRM

In Sr. FIRM, students continue to develop their research methods and applications. Students ready themselves for the presentation of their projects including mock presentations and critiques from their advisors.

## **Art & Science of Photography**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites/Co-requisites:** General Chemistry and a 35 mm SLR camera

**Focus:** Science or Art

The course is designed to introduce students to black and white photography. Students will learn basic photographic principles and darkroom techniques necessary to produce quality black and white negatives and prints. Students will study artistic aspects of photography such as composition, perspective, contrast, etc., and basic scientific principles such as writing balanced chemical equations, stoichiometry, and solubility rules.

## **American Folk Music and Acoustics**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Algebra II

**Focus:** Science or Art

This team-taught course combines the study of American musical history, the hand building of instruments, and performance with the study of the physical laws of acoustics. Students will learn to make, play, and test the acoustic properties of such traditional American instruments as the banjo, guitar, dulcimer, and mandolin. Performances will be scheduled each semester.

## **Advanced Placement Environmental Science**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Focus:** Science

This course is comparable to a college level introductory environmental science course. The course focuses on the impact of man on the environment, terrestrial and aquatic ecology, and energy conservation/resources. Field trips are periodically scheduled to visit professionals and facilities in the environmental science field. This course is recommended for students who plan to take the AP examination.

## **Astronomy**

**Credit:** ½

**Length:** 1 Semester, Fall only

**Prerequisites/Co-requisites:** Algebra II

**Focus:** Science

This is a one-semester introductory course to astronomy, the oldest science, emphasizing both a practical (observational) and a theoretical approach. Students will become familiar with telescopes (including our 12-inch Meade reflector) and with the sky. They will learn to identify the major constellations, stars, planets and clusters. Computer software observations as well as lab sessions (including spectroscopy) will be used. The course focuses on the study of fundamental physical laws and their applications and a thorough study of our solar system.

## **Astrophysics**

**Credit:** ½

**Length:** 1 Semester, Spring only

**Prerequisites/Co-requisites:** Algebra II, Astronomy or consent of department chair

**Focus:** Science

This course focuses on the universe as a whole. Included are the distance determination to stars and galaxies, nuclear reactions within stars, stellar evolution, stellar and galactic black holes and other remnants, elements of cosmology, such as the expansion and acceleration of the universe. Observations and lab sessions will be conducted.

## **Introduction to Geology**

**Credit:** ½

**Length:** 1 Semester, Spring, alternate years

**Prerequisites:** Algebra II

**Focus:** Science

This course is an introduction to geology. The topics to be discussed include minerals, rocks, maps and images, surface and internal processes, and geologic time and sequences. The course will have weekly laboratory activities that illustrate the current topics in class. Field trips to local geologic features may be conducted.

## **Introduction to Engineering Design**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** One year of science, Algebra II

**Focus:** Science

This course will start with a brief introduction to the engineering profession. Then it will focus on the Thayer School engineering design technique. Students will work in teams to design solutions for several real-world design problems here at the school or in the community. The teams would apply the formalism to determine the client's needs and then design a solution that meets those needs in a cost effective manner. Several of these projects will require building prototypes and competing against the other teams in the class. Developing effective communication and presentation skills and teamwork will also be important.

## **Engineering Problems**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** Algebra II

**Focus:** Science

Selected college sophomore level engineering problems from statics, circuits, thermodynamics, and general engineering science will be studied and solved with the goal of increasing the student's chance for success with the university curriculum.

## **Electric Circuits**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** Algebra II

**Focus:** Science

This course is one of problem solving in D.C. (direct current) and A.C. (alternating current) circuits composed of passive elements of resistance, capacitance, and inductance. Two physical device design problems will be treated (resistor and capacitor). The course will prepare the student for the sophomore level circuits courses required in engineering schools.

## **Electronics**

**Credit:** 1/2

**Length:** 1 Semester, Spring

**Prerequisites:** Electric Circuits or permission of instructor

**Focus:** Science

This course examines devices such as diodes, transistors (bipolar, FET, and MOSFET), gates, registers, and active circuits (rectifiers, amplifiers, flip-flops). Device characteristics translated to the design model and real world limitations are considered. Hands-on labs for design and analysis of circuits focus on device characteristics and circuit modeling.

## **Computer Aided Drawing (CAD)**

**Credit:** 1/2

**Length:** 1 Semester, Spring

**Prerequisites:** None

**Focus:** Science

The Computer Aided Drawing course is designed to introduce the student to the fundamentals of using the computer in the engineering and architectural design process. This is not a course in AutoCAD, although the students will utilize AutoCAD software. The course will be project oriented forcing the student to apply CAD concepts to mechanical, electrical, architectural, and engineering design applications.

## • ***CHEMISTRY***

### **General Chemistry**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Focus:** Science

This is a one-year introductory course for students who have no previous experience in chemistry. The student will begin the study of chemistry through an introduction to the elements of the periodic table. The structure of the atom and the arrangement of electrons in an atom will be studied and related to trends in the periodic table and to chemical bond formation. Stoichiometric relationships will be investigated as well as properties of gases, liquids, and solids. Students will end with a study of acid-base relationships. Extensive use of laboratory exercises will illustrate basic concepts discussed in lecture.

### **Advanced General Chemistry**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Selection by department chair per chemistry placement exam score

**Focus:** Science

**Concurrent Credit:** NPCC CHEM1104 Chemistry for Non-Majors I (1<sup>st</sup> Semester / 3 Hours) & NPCC CHEM1114 Chemistry for Non-Majors II (2<sup>nd</sup> Semester / 3 Hours)

This course is designed to give the advanced student a fuller understanding of the underlying concepts of chemistry. A student should be proficient in basic algebra, familiar with scientific measurement, the concept of elements and compounds, and the basic concept of the atom. Students will study atomic, electronic, and molecular structure, chemical bonding, properties, and trends of elements in the periodic table, and stoichiometry. Extensive use of laboratory exercises will illustrate basic concepts discussed in lecture. This course is only available to Juniors.

## **Advanced Placement Chemistry**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** General Chemistry or Advanced General Chemistry with a grade of a B or above.

**Focus:** Science

**Concurrent Credit:** UALR CHEM1402 General Chemistry I (1<sup>st</sup> Semester / 4 Hours) &  
UALR CHEM1403 General Chemistry II (2<sup>nd</sup> Semester / 4 Hours)

Advanced Placement Chemistry is equivalent to college-level, introductory chemistry. Students complete intensive and fast-paced learning that will prepare them to take the AP Chemistry examination.

## **Organic Chemistry**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** ASMSA Chemistry

**Focus:** Science

This course offers a brief survey of the fundamental types of organic compounds, their nomenclature, classification, preparation, and reactions, with emphasis on structure, bonding, stereochemistry and reaction mechanisms. Selected experiments in Organic Chemistry will emphasize techniques, properties, and synthesis of organic compounds.

## **Biochemistry**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** ASMSA Chemistry

**Focus:** Science

This course provides a brief survey covering the chemistry of carbohydrates, lipids, nucleic acids and proteins, and the action of vitamins, hormones, and enzymes. Selected experiments in biochemistry will emphasize techniques and properties of biochemical compounds. A clinical correlation is integral to the course.

## **Analytical Chemistry**

**Credit:** ½ credit

**Length:** 1 Semester, Fall only

**Prerequisites:** ASMSA Chemistry.

**Focus:** Science

This course uses and reinforces concepts learned in General Chemistry and Advanced General Chemistry. This course is not designed to replace AP Chemistry. The course begins reviewing basic units of measurement and concentration, followed by a review of stoichiometry. Error in chemical analysis, random error evaluation, and statistical analysis will be addressed next. Finally, chemical equilibria, gravimetric analysis, electrochemistry, and instrumental analysis will be studied. This semester will be approximately 50 % lab work.

## **Qualitative and Quantitative Analysis**

**Credit:** ½ credit

**Length:** 1 semester, Spring only

**Prerequisites:** ASMSA Chemistry and Analytical Chemistry (or permission of the instructor.)

**Focus:** Science

This course studies the separation and identification of components of a substance based on the solubility rules, followed by studying the process of determining the concentration of the species present or the percent composition of a mixture. General laboratory procedures will be studied and followed so that the student will be able to safely and swiftly identify cations and anions based on their solubility. This semester will be approximately 75 % lab work.

## • ***BIOLOGY***

### **Advanced Placement Biology**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Biology

**Co-requisites:** Any Chemistry course

**Focus:** Science

**Concurrent Credit:** UALR BIOL 1401 Science of Biology (1<sup>st</sup> Semester / 4 Hours)

UALR BIOL1400 Evolution & Environmental Biology (2<sup>nd</sup> Semester / 4 Hours)

AP Biology is equivalent to college level introductory biology. This course will cover all aspects of biology including basic chemistry, structures and functions of the cell, biological pathways, anatomy and physiology of plants and animals, taxonomy, and ecology. The course is laboratory intensive and will prepare students for the AP examination.

### **Anatomy & Physiology**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Biology

**Focus:** Science

**Concurrent Credit:** UALR BIOL 1411 Intro to Human Anatomy & Physiology I (1<sup>st</sup> Sem. / 4 Hours)

UALR BIOL 1412 Intro to Human Anatomy & Physiology II (2<sup>nd</sup> Sem. / 4 Hours)

This course is equivalent to college level introductory anatomy and physiology. The course will cover all systems of the body at all levels of anatomical organization. The student will also learn the physiology behind bodily functions.

### **Microbiology**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** None

**Focus:** Science

**Concurrent Credit:** UALR BIOL 2401 Microbiology (4 Hours)

This course provides an integrative view of the microbial world including prokaryotes, protists and viruses. The study of Microbiology is fundamental to the understanding and practice of many disciplines in Biology from Medicine to Environmental Science. This course covers the history, basic genetics, physiology and ecology, laboratory techniques and applications of Microbiology.

## **Zoology**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** Biology

**Focus:** Science

**Concurrent Credit:** UALR BIOL 2403 Zoology (4 Hours)

Zoology presents an introduction to the Animal Kingdom. The course focuses on the specific structural and functional adaptations of the major phyla within the conceptual framework of cell biology, genetics and evolution. Both the invertebrate and the vertebrate phyla will be studied.

## **Biomedical Physics**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Trigonometry, Biology

**Co-requisites:** AP Calculus

**Focus:** Science

**Concurrent Credit:** UALR BIOL 1411 Into to Human Anatomy & Physiology I (1<sup>st</sup> Sem. Only / 4 Hrs.)

Biomedical Physics is essentially a general physics course using the human body as the model. The course is designed to introduce students to the basic concepts of General Physics and other concepts of physics that apply specifically to systems of the body. Students will gain a basic understanding of human anatomy and physiology as it applies to physics. This is an excellent course for students who are interested in entering the fields of medicine, medical terminology, biotechnology, and applied sciences. The course can be counted toward the graduation requirement for physics or as a general science focus credit. Students must successfully complete both the biology and physics portions of the course.

## **Aquatic Biology**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** Biology

**Focus:** Science

**Concurrent Credit:** Lower level Biology credit as evaluated upon admissions to UALR only (4 Hours)

Aquatic Biology is a one-semester course. It provides an introduction to the biology and ecology of aquatic organisms and habitats. The course examines the earth's freshwater and marine environments from geophysical, chemical and biological perspectives. The laboratory provides experience in modeling of aquatic processes, water assessment and examination of aquatic organisms. Some topics that will be discussed are marine and freshwater life, the history of oceanography, plate tectonics, waves and tides, marine pollution, and the freshwater creatures of Arkansas. Basic in-house laboratory exercises as well as field trips to area streams and lakes are to be expected. **This course is offered in alternating years.**

## **Basic Genetics**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** None

**Co-requisites:** Microbiology or AP Biology (grade of B or better upon completion of the first semester) or Organic Chemistry.

**Focus:** Science

**Concurrent Credit:** Lower level Biology credit as evaluated upon admissions to UALR only (4 Hours)

This course is designed to give the student a basic understanding of modern genetics. Traditional Mendelian inheritance will be discussed, followed by the study of mitosis and meiosis. The structure, function, replication, and translation of DNA will be discussed. Current molecular biological techniques will be studied. Laboratory exercises will illustrate concepts and techniques discussed in lecture.

## **Developmental Biology**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** one year of biology at ASMSA, senior standing or permission of instructor

**Co-requisites:** None

**Focus:** Science

**Concurrent Credit:** Lower level Biology credit as evaluated upon admissions to UALR only (4 Hours)

Developmental Biology traces the journey from egg to adult and examines how genes make individuals. The course provides an integrated view of embryology, genetics and evolution to reveal the remarkable unity of living things and the subtle differences that define the diversity of life. The study of Developmental Biology is currently at the center of medical and genetic research, cloning, stem cells, and is an essential area of biology that integrates and defines all other areas of the Life Sciences.

## **Botany**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** Biology

**Focus:** Science

**Concurrent Credit:** UALR BIOL 2402 Botany (4 Hours)

Botany introduces students to the world of plants, their unique adaptations and their importance to humans and the rest of the natural world. The course examines the structure, physiology and reproduction of plants, the evolutionary relationships of the seed and non-seed plants, with laboratory experience in plant development, horticulture and plant identification. The focus of the course will be on the physiology and genetics of plants with much less emphasis on descriptive botany. Field trips and laboratory exercises are an important part of the class.

## **Immunology**

**Credit:** 1/2

**Length:** 1 Semester, Spring

**Prerequisites:** None

**Focus:** Science

**Concurrent Credit:** Lower level Biology credit as evaluated upon admissions to UALR only (4 Hours)  
Immunology is a college-level survey of the immune system. The course examines the cells and organs of the immune system; antibodies and antigens; the inflammatory, humoral and cellular immune responses; and the genetic regulation and evolution of immunity. Special topics include allergies, autoimmune diseases and HIV. Grades in the course reflect performance on four lecture exams, the final exam, lab exercises, a research project and poster presentation. Immunology has no formal prerequisites beyond a basic understanding of cell biology and genetics.

### • ***PHYSICS***

## **General Physics**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Algebra II

**Co-requisites:** Finite Math

**Focus:** Science

This course is a full-year introduction to the basic principles of physics. The topics covered are motion, waves, fluids, thermodynamics, and electricity and magnetism. Laboratory exercises are done weekly. This course satisfies the physics graduation requirement. The student's math placement score determines placement in this course. Students scoring above the cut-off value will not be admitted.

## **Advanced General Physics**

**Credit:** 1 unit

**Length:** 1 year

**Pre-requisite:** Algebra II and Trigonometry

**Focus:** Science

Advanced General Physics is a full-year introduction to the basic principles of physics taught at a faster pace and with more emphasis on problem solving than General Physics. This course also covers a few additional topics. The topics covered are motion, forces, energy, momentum, rotation, vibrations, waves, fluids, thermodynamics, and electricity and magnetism. Lab exercises are an important part of the course. This course should be taken by the majority of ASMSA students and it counts towards the physics graduation requirement.

## **Biomedical Physics**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Trigonometry, Biology

**Co-requisites:** AP Calculus

**Focus:** Science

**Concurrent Credit:** UALR BIOL1411 Into to Human Anatomy & Physiology I (1<sup>st</sup> Semester / 4 Hours)

Biomedical Physics is essentially a general physics course using the human body as the model. The course is designed to introduce students to the basic concepts of General Physics and other concepts of physics that apply specifically to systems of the body. Students will gain a basic understanding of human anatomy and physiology as it applies to physics. This is an excellent course for students who are interested in entering the fields of medicine, medical terminology, biotechnology, and applied sciences. The course can be counted toward the graduation requirement for physics or as a general science focus credit. Students must successfully complete both the biology and physics portions of the course.

## **Advanced Placement Physics C**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Trigonometry

**Co-requisites:** AP Calculus AB or BC or higher

**Focus:** Science

This is a math-intensive physics course equivalent to the college course taken by engineers and physical science majors. It covers mechanics, electricity, and magnetism. It is intended to prepare students for the Physics C examination which can be used for up to 8 hours of college credit. It makes an excellent follow-up class to General Physics or a first-year class for students with strong math skills. This course satisfies the physics graduation requirement. Students enrolled in BC Calculus or higher are strongly encouraged to take this physics course.

## **Advanced Topics in Physics**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Completion of one or more of the following: General Physics, Biomedical Physics, AP Physics C, or permission of department chair

**Focus:** Science

The students and teacher will work together to select topics for in-depth study, including laboratory investigation where applicable. Topics will be chosen from these areas: fluid mechanics, thermodynamics and statistical mechanics, solid state physics, advanced optics, lasers, non-linear systems (chaos), relativity quantum mechanics, atomic physics, nuclear physics, elementary particle physics, geophysics, and astrophysics and cosmology. **This course will not be offered for the 2009-2010 school year.**

## **Optics**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** General or Biomedical Physics or AP Physics C

**Co-requisites:** AP Calculus

**Focus:** Science

Optics is a one-semester elective course covering topics ranging from geometric optics to thin lenses and imaging. Areas of study will include the basics of linear algebra, matrix methods of lens design, study of polarized light phenomena, and physiological optics and vision. Laser physics will be introduced if time permits.

## **Energy, Heat & Thermodynamics**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** One Semester of AP Calculus and AP Physics C or Advanced General Physics

**Focus:** Science

This is a one-semester course designed to develop the central themes of energy transfer. An overview of the energy conservation principle, heat transfer, low-temperature physics, thermodynamics, and thermal chemistry will be discussed. Calculus will be utilized throughout the entirety of the class. Additional mathematical tools will be taught as needed during the semester.

## **• *COMPUTER SCIENCE***

### **Computer Programming I**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Algebra II

**Focus:** Computer Science

**Concurrent Credit:** UALR CPSC 1375 Intro to Computer Science (3 Hours)

Computer Programming I is an introductory computer science course using the Java programming language. Because the development of computer programs to solve problems is a skill fundamental to the study of computer science and is increasingly important in all fields of applied sciences, a large part of the course is built around the development of computer programs or parts of programs that correctly solve a given problem.

### **Computer Programming II**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Computer Programming I or consent of instructor

**Focus:** Computer Science

**Concurrent Credit:** UALR CPSC 2376 Programming II (3 Hours)

Computer Programming II is designed to provide a challenging course that will improve students' computing skills and expose them to more in-depth material on topics covered in the Computer Programming I course such as abstraction, logic, and data structures. Programming methodology will be the focus of this course with a stronger emphasis on problem solving and algorithm development. This course is primarily designed for students considering Computer Science or Engineering as major areas of college study. This course, along with the Computer Programming I course, is meant to be equivalent to a first-semester college course in computer science. Students completing this course will be prepared to pass the AP Computer Science A exam.

## **Computer Programming III**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Computer Programming II

**Focus:** Computer Science

**Concurrent Credit:** UALR CPSC 2380 Data Structures & Algorithms (3 Hours)

The Computer Programming III course is an extension of the Computer Programming II course. It extends a more rigorous study of topics covered in the "CPII" course with the inclusion of additional topics such as linked lists, stacks, binary trees, recursive data structures, dynamically allocated structures and invariants. It is recommended for students considering the study of Computer Science or Engineering as a major in college. Students completing this course will be prepared to pass the A Computer Science AB exam.

## **Introduction to Artificial Intelligence & Robotics**

**Credit:** ½

**Length:** 1 Semester, Spring

**Prerequisites:** Computer Programming I or consent of instructor

**Focus:** Computer Science

This course involves the introduction of the study of both Artificial Intelligence (A.I.) and of Robotics. A survey of AI topics/applications may include induction, pattern recognition, game theory, genetic programming, and robotics. As for the Robotics portion of the course, topics include a historical overview and hands-on labs that utilize Lego Mindstorm Robotics kits, the MIT Handy Board, and GameBoy Advance Controllers. This course is offered in conjunction with the annual Botball Robotics Tournament in the Spring.

## **Visual Basic**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** None

**Focus:** Computer Science

This course focuses on the creation of event driven (user flow control) applications for the graphical user interface (windows). It provides a good introduction to the philosophy of and need for object-oriented programming; complementing C++ and Java as a development tool and makes single user development feasible by eliminating most of the code previously required, particularly in building the user interface. This course will enable building engineering and technical design support systems and aid students in the development of presentations and problem solutions.

## **Introduction to Web Application Development**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

**Focus:** Computer Science

**Concurrent Credit:** UALR IFSC 1310 Internet Technologies (3 Hours)

Introduction to Web Application Development in HTML with PHP ("Web Apps") will refresh the student's familiarity with HTML and provide the foundations for creating dynamic pages and sites based upon one of the fastest growing programming languages in use. Students who already know the basics of authoring simple, static web pages will learn how to make dynamic pages that can react to user input, access information in databases, generate custom output, and manipulate images. Because PHP is syntactically similar to java and C++, those students who have had exposure to those languages will be able to make a natural transition into PHP. Additionally, basic data modeling and database programming topics will be introduced; Students will use these skills to make data-driven sites.

## **Introductory Computing Elements (ICE)**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Algebra II

**Focus:** Computer Science

This is a course for "non-majors" (those not seeking in-depth study in Computer Science). Elements of this field will be presented, and the students will learn to use the technologies and techniques to think critically and solve problems. Select examples and problems in Boolean algebra and discrete math, logic circuits, computer programming fundamentals, number systems, data storage and retrieval, Internet concepts, and recursion will be covered. The course will be suitable for non-CSE "majors" yet appropriate and useful for those specializing in the subject. This course will help prepare students for the American Computer Science League written exam.

## **Introduction to Computer Networking**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Instructor Permission

**Focus:** Computer Science

Computer Networking deals with the design, analysis, and implementation of computer networks and data communication systems. We will work our way through the seven-layer OSI Model to explore the design of modern communication systems. Transmission technology, packet switching, routing, flow control, and application protocols will also be discussed. The second half of the semester will be used for hands-on implementation of the technologies discussed in the lecture.

## **Oracle Database**

**Credit:** 1

**Length:** 2 Semesters

**Prerequisites:** Instructor Permission

**Focus:** Computer Science

Oracle Database consists of two semesters of data modeling, relational database design, and database programming. The first semester is largely conceptual in that students are challenged to identify patterns or connections between information that is not obviously related, and to identify key or underlying issues in complex situations. Student activities are designed to include using creative, conceptual and inductive reasoning. The second portion of this course is designed to help prepare students to pass the Academy SQL Final exam. As part of the Academy, many students will want to take the Oracle Certified Professional exam, as it is the industry standard for proficiency with SQL. As a member of the Oracle Internet Academy, students are provided the opportunity to take the exam online or through a testing center for free or at a significant discount.

## **Ethics and Technology**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

**Focus:** Computer Science

**Concurrent Credit:** UALR IFSC 1110 Introduction to Ethics (3 Hours)

Ethics and Technology concentrates on the theory and practice of ethics as they relate to computing and associated technologies. The aim of the course is to study the basis for ethical decision-making and the methodology for reaching ethical decisions concerning these matters. Class discussions of case studies, individual student presentations, guest speakers, and the inclusion of current events will be used.

## **C++**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** Computer Programming I

**Focus:** Computer Science

An introduction to programming in C++. Good programming style is stressed. Topics included are: documentation of programs, structuring programs, top-down design of programs, linear program flow, decision structures, loops, internal sorts, and classes. The student will have an understanding of these topics from Introduction to Programming I. They will learn the syntax of C++ and how these topics are implemented using C++. Procedural programming and object oriented programming will be covered.

## **Computer Science Research Through Technology (CSRTT)**

**Credit:** ½

**Length:** 1 Semester, Fall

**Prerequisites:** Consent of Instructor

**Focus:** Computer Science

CSRTT is a computer science focused section of the introductory, team-taught course in science research, computer science and mathematics. Like the other sections, CSRTT develops problem-solving skills using technology. Students have hands-on experiences and practice in the use of mathematics software packages, CBLs, CBRs, programming, graphing calculators and fundamentals of computer systems, Windows, spreadsheets, web pages, and communications packages. Computer Science Research Through Technology provides interdisciplinary skills needed for report writing, research, statistics, and problem solving. All juniors are required to successfully complete RTT or CSRTT in the fall of their junior year for graduation. **Students with an interest in Computer Science should sign up for CSRTT.**

# HUMANITIES DEPARTMENT

## Humanities Department Preamble

The ASMSA Humanities Department, with eleven faculty members and over thirty courses, is the largest department at ASMSA. Our courses include two levels of English composition and multi levels of three foreign languages, interdisciplinary history and literature courses, and many specialized courses including speech and literature/history electives. We offer three interdisciplinary courses with the science department: American Folk Music and Acoustics, Science of Art, and Art and Science of Photography. The philosophy of the Humanities Department has developed from three key beliefs. First, team organization and teaching is superior to the isolated, solitary classroom. Secondly, Socratic seminars, in which questions are more important than answers, are preferable to the teacher dispensing knowledge through lecture. Third, the most effective way for students to demonstrate mastery of concepts and skills is by varied means of assessment which range from research papers to debates, from student-produced films to game simulations, from in-class essays to re-enactments of historical events, while including traditional text-based content tests. Our writing labs provide students with Internet access, e-mail, and a curriculum that is totally interdisciplinary with all the other departments in the school.

## • **ENGLISH**

### Junior English Composition (JEC)

**Credit:** 1 English

**Length:** 1 Year

**Prerequisites:** None

JEC is a structured course emphasizing writing skills in the context of assignments given in other classes but carried out in JEC. Students begin with refining their paragraph writing skills before progressing to various essay forms, science and social studies research papers, literary analyses, and college admissions essays. Students write one research paper per semester along with weekly essay and research assignments. Special emphasis is placed on writing skills needed for success in college. The course culminates with a detailed college admissions unit designed to prepare students for that process as seniors. **This course is required for all juniors.**

### Senior English Composition (SEC)

**Credit:** 1 English

**Length:** 1 Year

**Prerequisites:** JEC

**Concurrent Credit:** UALR RHET1311 English Composition I (1<sup>st</sup> Semester / 3 Hours)

UALR RHET1312 English Composition II (2<sup>nd</sup> Semester / 3 Hours)

Less structured and allowing more independence than JEC, SEC continues to refine writing skills developed earlier. Using the text of many freshman college courses, *Writing, A Handbook*, as well as other ancillary texts as needed, students write and analyze various essay forms and produce research papers. The course focuses on using written sources from across the ASMSA curriculum; learning how to develop a sound argument; constructing a clear organization; and writing well developed paragraphs containing correct sentence structures. Further, study of literature improves students' reading and writing skills as they create essays based upon analysis and synthesis. **This course is required for all seniors.**

## **Speech**

**Credit:** ½ elective

**Length:** 1 Semester

**Prerequisites:** None

This introductory course for public speaking includes informative speaking, persuasive speaking, and debate, with emphasis on extemporaneous speaking. Preparation for scientific research using a multi-media approach is emphasized.

## **Ancient Greek Literature**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisite:** None

The course is designed to cover the major cultural achievements of the Greeks from the Archaic and classical periods, with special emphasis given to the role of Athens. While the course is mostly centered upon literature, other elements of Greek culture such as politics, mythology, gender roles, and the visual arts are also discussed. Authors to be read include, but are not limited to, Homer, Aeschylus, Sophocles, Euripides, Aristophanes, Herodotus, and Thucydides.

## **Survey of Women Writers**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisite:** None

This course examines various British and American female authors from the Middle Ages to the present. The roles of women in society and in the home during different time periods will be explored. Poems, essays, short stories, and novels will be read and discussed in their historical context. **This course will not be offered in the 2009-10 school year.**

## **Journalism**

**Credit:** 1 elective

**Length:** 1 Year

**Prerequisites:** None

This course incorporates the study of journalistic skills with the publication of an online monthly school newspaper and the creation of the yearbook. Skills to be studied, used, and mastered include journalistic writing techniques, methods of gathering and writing news and feature stories, use of Adobe Photoshop and other media layout and production technologies, news and feature photography, and newspaper and yearbook design and production.

## **The Study and Creation of Contemporary Writing**

**Credit:** ½ elective

**Length:** 1 Semester

**Prerequisites:** None

In this semester-long class, students study some of the best modern writings by authors from around the world working in the genres of short fiction, poetry, screenwriting or creative non-fiction. Depending on the preference and expertise of the instructor, the class may function as a broad survey of several of these genres or focus in depth on a single one. In addition to composing and sharing their own creative work in large-group workshops, students will read and research authors' works, make biographical presentations to the class and write research papers on stories, poems or essays.

## **Comic Books in America**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisites:** None

This course studies the comic book as a genre of American literature and as a reflection of American popular culture from the 1930s to today. The first quarter will examine the history and culture of the comic book, paying particular attention to how they deal with social issues and times of national crisis. The second quarter will be devoted to the process of creating individual student comic books from script to print. **This course will be offered in the 2009-10 school year.**

## **Heroes and Villains**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisites:** None

This course seeks to gain a better understanding of notable historical figures and their influence on human history. By applying the principles of psychology in a survey of history, famous men and women will be analyzed through a discussion of primary and secondary sources to determine their characterizations as hero or villain. The class is team-taught and stresses the ideas and methods of both psychology and history. **This course will not be offered in the 2009-10 school year.**

## **Modern American Novels**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisites:** None

During the twentieth century, the novel came into its own as an art form. This class will focus on twentieth century novels by American writers and will discuss the art of fiction as well as themes, characterizations, motifs, and historical impact of each work. Books to be read may include *Housekeeping*, *White Noise*, *The Things They Carried*, *On the Road*, and *The Sun Also Rises*. **This course will not be offered in the 2009-10 school year.**

## **Survey of World Literature**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisite:** None

**Concurrent Credit:** UALR ENGL2337 World Literature (3 Hours)

During this course students will read works spanning many centuries, from Western and non-Western literature. The course will offer an introduction to literary works from a variety of cultures with at least one major text from each of four periods (antiquity, medieval, early modern, and modern) and from a minimum of three literary genres. A major goal of the course will be for students to come to understand these works in the contexts of their wider literary and cultural heritages and to better understand their place in the world. **This course will be offered in the 2009-10 school year.**

## **African-American Literature**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** none

Students read and critically analyze novels, short stories, and poetry from significant periods in African-American literature. The course begins with pre-Revolutionary War poetry and progresses through the following periods: Postbellum; Harlem Renaissance; Naturalism; Myth, Legend, and Ritual; to the late twentieth century. The course requires students to examine works of literature and participate in informative seminar sessions about what they read. The course examines writers such as Countee Cullen, James Baldwin, Booker T. Washington, and Zora Neale Hurston. Possible texts may include *Up From Slavery*, *The Souls of Black Folk*, *Go Tell It On the Mountain*, and *Heritage*.

**This course will be offered in the 2009-10 school year.**

## **Introduction to Philosophy Through Film and Literature**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisite:** none

The purpose of this course is to give students an overview of philosophical ideas as well as to encourage analysis of these ideas through the works of great writers and directors. Topics to be addressed include ethics, epistemology, the nature of reality, free will, and freedom vs. responsibility. In addition to selections from works of philosophy, possible texts may include *Antigone*, *The Stranger*, *Zorba the Greek*, and *Siddhartha*. Films to be screened include *The Matrix*, *Waking Life*, and *The Truman Show*.

## **Literature of the Contemporary South**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisite:** none

**Concurrent Credit:** UALR ENGL2335 Introduction to Literature (3 Hours)

In the course of reading short fiction, essays, poetry, and novels by recent and contemporary Southern writers, students must consider the ways in which these works do or do not participate in the Southern tradition of writing and thinking. Our purpose will be to study the literature and culture of this region in the hopes of learning about the anxieties, hopes, values, and prejudices of its people. Authors may include Bobbie Ann Mason, Lewis Nordan, Harry Crews, Larry Brown, Ernest Gaines, Alice Walker, and James Wilcox. **This course will be offered in the 2009-10 school year.**

# **• SOCIAL SCIENCES**

## **American Studies**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Concurrent Credit:** UALR HISTORY 2311 US History to 1877 (1<sup>st</sup> Semester / 3 Hours)

UALR HISTORY 2312 US History since 1877 (2<sup>nd</sup> Semester / 3 Hours)

Team-taught, American Studies combines literature, art, and music with the study of history for a clearer understanding of both historical period and its artifacts. Classes are taught through Socratic seminar, with chapter reading quizzes followed by essay/short answer unit tests. Students will read a novel each quarter, write at least one research paper and a literary analysis, and participate in alternative assessments.

## **World Studies**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Concurrent Credit:** UALR HISTORY 1311 History of Civilization I (1<sup>st</sup> Semester / 3 Hours)

UALR HISTORY 1312 History of Civilization II (2<sup>nd</sup> Semester / 3 Hours)

Team-taught, the course is a yearlong chronological study of important trends, events, personalities, and ideas from earliest times to the present. Students will critically analyze both Western and Non-Western source material, including literature and artworks, to formulate and answer historical questions. Teaching will stress Socratic dialogue and student involvement. Assessments will include Internet-based reviews, creation of topical web pages, Readers Theater, as well as projects, essays, and objective exams. Key concepts from geography, economics, philosophy, and psychology will also be incorporated into the course. This course prepares the students to take the AP World History Exam.

## **Advanced Placement U.S. History**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Concurrent Credit:** UALR HISTORY 2311 US History to 1877 (1<sup>st</sup> Semester / 3 Hours)

UALR HISTORY 2312 US History since 1877 (2<sup>nd</sup> Semester / 3 Hours)

Taught in the same manner as American Studies, AP U.S. History combines the teaching of literature, art, and music with history to emphasize analysis of events and persons critical to the development and growth of the United States. Students will take extensive essay tests, write two research papers and a literary analysis, and participate in alternative assessments. The culminating event, for those students who wish to take it, is the AP examination.

## **Advanced Placement U.S. Government & Politics**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

The course provides students an analytical perspective on government and politics in the United States. The course includes both the study of general concepts used to interpret U.S. politics and the analysis of specific examples. It also requires familiarity with the various institutions, groups, beliefs, and ideas that constitute U.S. politics. Students should become acquainted with the variety of theoretical perspectives and explanations for various behaviors and outcomes. The culminating event, for those students who wish to take it, is the AP examination.

## **U.S. Government & Politics**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

The course provides students an analytical perspective on government and politics in the United States. The course includes both the study of general concepts used to interpret U.S. politics and the analysis of specific examples. It also requires familiarity with the various institutions, groups, beliefs, and ideas that constitute U.S. politics. Students should become acquainted with the variety of theoretical perspectives and explanations for various behaviors and outcomes.

## **Advanced Placement Comparative Government & Politics**

**Credit:** ½ elective

**Length:** 1 Semester

**Prerequisites:** None

This course provides the students with the conceptual tools necessary to develop an understanding of some of the world's diverse political structures and practices. The course encompasses the study of specific countries and their governments, as well as general concepts used to interpret the political relationships and institutions found in virtually all national politics. Five countries form the core of the AP Comparative Government and Politics exam. Four of these – Great Britain, France, China, and Russia/former Soviet Union – are commonly covered in college-level introductory comparative politics courses because they provide a foundation for developing paradigms of different types of political systems. The inclusion of a fifth developing country – India, Mexico, or Nigeria – allows students to examine yet another source of theory building, as well as understand the political implications of different levels of economic development. Students participate in Model UN activities. The culminating event, for those students who wish to take it, is the AP examination.

## **Comparative Government & Politics**

**Credit:** ½ elective

**Length:** 1 Semester

**Prerequisites:** None

This course provides the students with the conceptual tools necessary to develop an understanding of some of the world's diverse political structures and practices. The course encompasses the study of specific countries and their governments, as well as general concepts used to interpret the political relationships and institutions found in virtually all national politics. Students participate in Model UN activities.

## **Sociology**

**Credit:** ½ elective

**Length:** 1 Semester, Spring

**Prerequisites:** None

This course is an introduction to sociology, a field concerned with the systematic study of the relationship between individuals and their societies. The class provides a broad range of contemporary and historical cross-cultural learning experiences that help the student to understand and appreciate social diversity. Emphasis is placed on the cultural and social diversity within the US as well as other cultures of interest to the students. Course work includes lectures, discussions, oral presentations, and film critiques.

## **Psychology**

**Credit:** ½ elective

**Length:** 1 Semester, Fall

**Prerequisites:** None

This course addresses the scientific study of behavior and mental processes, which will enable the student to better understand the foundation of the science of psychology. The current major perspectives in the field are studied, as well as the primary theorists and their ideas. In addition, the class examines the role of the psychologist and other professionals in the field, discovers how a psychologist conducts research, and notes the role of ethics in psychological research and practice. The course includes lectures, discussions, readings, oral and written presentations, and films.

## **American Civil War**

**Credit:** ½ elective

**Length:** 1 semester, Fall

**Prerequisites:** None

This course covers the American Civil War, tracing the beginnings of secession through Reconstruction. Students will develop a deeper understanding of the social, economic, political, and military themes of the war, and learn how the country was transformed during the period. Students will read *Gods and Generals*, *The Killer Angels*, *The Last Full Measure*, *Battle Cry of Freedom* as well as conduct independent research and explore the various themes through film and literature. **This course will be offered in the 2009-10 school year.**

## **The Second World War**

**Credit:** ½ elective

**Length:** 1 semester, Spring

**Prerequisites:** None

This course will explore the causes of the most cataclysmic event in human history and include a study of the major campaigns around the globe and the central figures that would shape and direct the war. Additionally, students will study the aftermath of the war and how the World War set the stage for a Cold War.

## **Twentieth Century America**

**Credit:** ½ elective

**Length:** 1 semester, Spring

**Prerequisites:** None

This course will explore 20th century America, focusing not only on the major historical events of the century, but also examining literature, film, and visual art from that era to help students develop a more complete picture of how the US changed culturally, politically, and economically during that time. **This course will be offered in the 2009-10 school year.**

## **Comparative World Religions**

**Credit:** ½ elective

**Length:** 1 Semester

**Prerequisites:** None

This course compares and contrasts world religions by examining primary and secondary sources. Although special attention will be given to the five major religions of Judaism, Christianity, Islam, Hinduism, and Buddhism, lesser known religions such as Sikhism, Zoroastrianism, Taoism, and Confucianism will be covered as well. **This course will be not be offered in the 2009-10 school year.**

## **Studies in Genocide and Human Rights**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisites:** None

Students will learn about the Declaration of Human Rights and several major examples of flagrant human rights abuses in our shared history.

Course materials include articles, stories, memoirs, films and documentaries about the Holocaust and other genocides. Students identify hope amid the destruction by brainstorming effective strategies for preventing and combating atrocities and for treating and caring for torture victims. Individual research, presentation, analysis, writing and discussion are required. Graphic subject matter. **This course will be offered in the 2009-10 school year.**

## **Advanced Topics in Genocide and Human Rights Studies**

**Credit:** ½ elective

**Length:** 1 semester

**Prerequisites:** Studies in Genocide and Human Rights

Students will learn about the perpetration, punishment and representation of genocide, war crimes and other mass atrocities, focusing on specific topics, with particular regard to European, Latin American, African and Asian genocides. Topics will include the unique experiences of women, children and the elderly, survivors and their descendants, complicity and non-intervention, war crimes trials and other forms of redress, and the role of propaganda in fueling genocide. Course materials include fiction and non-fiction articles, stories, memoirs, graphic novels, films and documentaries about the Holocaust and other genocides. Individual research, presentation, analysis, writing and discussion are required. Graphic subject matter. **This course will be offered in the 2009-10 school year.**

## **Anthropology**

**Credit:** ½ elective

**Length:** 1 semester, Spring

**Prerequisites:** None

This course is a broad survey of the discipline of anthropology that will cover the origins, development, and nature of humans and their cultures. Students will examine general anthropological concepts and methods by exploring its four major subfields: physical anthropology, archaeology, cultural anthropology, and linguistic anthropology. The primary topics covered in this course will be human and primate evolution, prehistory, ethnic groups, race, and cultural characteristics such as language, religion, family structure, marriage, politics, and economy. Finally, this course will examine the evolution of global patterns that are present in the world today. These include economic systems, colonialism, and globalization.

## **• FINE ARTS**

### **Art & Science of Photography**

**Credit:** ½ fine art

**Length:** 1 Semester

**Prerequisites/Co-requisites:** General Chemistry and a 35 mm SLR camera

The course is designed to introduce students to black and white photography. Students learn basic photographic principles and darkroom techniques necessary to produce quality black and white negatives and prints. Students study artistic aspects of photography such as composition, perspective, contrast, etc., and basic scientific principles such as writing balanced chemical equations, stoichiometry, and solubility rules. **This course will count for an art or science credit.**

### **American Folk Music and Acoustics**

**Credit:** 1 fine art

**Length:** 1 Year

**Prerequisites:** Algebra II

**Focus Credit:** Science or Art

This team-taught course combines the study of American musical history, the hand building of instruments, and performance with the study of the physical laws of acoustics. Students learn to make, play, and test the acoustic properties of such traditional American instruments as the banjo, guitar, dulcimer, and mandolin. Performances will be scheduled each semester. **This course will count for a fine art or science credit.**

## **Art History**

**Credit:** ½ fine art

**Length:** 1 semester, Spring

**Prerequisite:** None

Specific course subject matter will vary from semester to semester depending upon student interest, but the course is designed as a general survey. Subjects may vary from ancient Greco-Roman, to Renaissance, to American art history. The emphasis will be on examining, analyzing, and understanding the dominant aesthetic idea at work within the time and culture under examination.

**This course will be offered in the 2009-10 school year.**

## **2D Art**

**Credit:** ½ fine art

**Length:** 1 Semester, Fall

**Prerequisites:** None

2D Art is an investigation of two-dimensional media. The course emphasizes two-dimensional composition, design, and study of color. Students work weekly in a sketchbook. **This course will count for a fine art credit.**

## **3D Art**

**Credit:** ½ fine art

**Length:** 1 Semester, Spring

**Prerequisites:** None

3D Art is an investigation of three-dimensional media. The course emphasizes composition, design, and execution in an “in the round” work of art. Students may create wire sculptures, pottery, jewelry, or other works that student interest dictates. **This course will count for a fine art credit.**

## **Graphic Design**

**Credit:** ½ Fine Art

**Length:** 1 Semester, Fall and Spring

**Prerequisites:** None

**Focus:** Art

The graphic design course offers computer design instruction in the aesthetic, creative and technical aspects of graphic design. Students are introduced to concepts of design including line, shape, color, pattern, texture and space as well as computer design based typography, logo design, page layout, and web site design. Professional studio techniques in Adobe Photoshop and supplemental programs are used in instruction.

## **Documentary Film Making**

**Credit:** 1 elective

**Length:** 1 Year

**Prerequisites:** Seniors Preferred

This class is comprised of two major parts: the study of film, and the creation of film. During the year, students will watch excerpts from many movies and learning the language with which to discuss and critique the films. They will study pans and tracking shots, transitions and lighting, sound and writing, and try to cover every aspect of film from the initial idea to the final product. The ultimate goal of the class will be the creation of original, student-produced, documentary films.

## **Fundamentals of Painting**

**Credit:** ½ fine art

**Length:** Semester, Spring

**Prerequisites:** None

Fundamentals of Painting will focus on traditional methods and techniques in beginning painting with the opportunity to explore more contemporary approaches. Students will start their first semester in the course with beginning exercises and advance to fuller explorations of landscape, conceptual, interior, and figure painting. The course will function as a Painting I, II, & III where beginning students can enter at any semester, and students who are taking the course for a second or third semester will explore a more advanced set of painting goals building towards a personal portfolio. This course will count as an art credit.

## **Fundamentals of Drawing**

**Credit:** ½ fine art

**Length:** Semester, Fall

**Prerequisites:** None

Fundamentals of Drawing will focus on traditional methods and techniques in beginning drawing with the opportunity to explore more contemporary approaches. Students will start their first semester in the course with beginning exercises and advance to fuller explorations of 2D design, volume, line, shape, working from still life, in abstraction, in landscape or interior, and from the figure. The course will function as a Drawing I, II, & III where beginning students can enter at any semester and students who are taking the course for a second or third semester will explore a more advanced set of drawing goals building towards a personal portfolio. This course will count as an art credit.

## **• LANGUAGES**

### **Spanish II**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Spanish I

**Concurrent Credit:** UALR SPAN 1311 Elementary Spanish I (2nd Semester Grade Only / 3 Hours)

Students should be able to talk in present tense, use three standard verb forms, understand the basic irregular forms, have a knowledge of vocabulary in numbers, times, weather expressions, greetings, family discussions, and question techniques. They need to understand where the Spanish-speaking world is and some of the differences between the various Spanish cultures and American culture.

### **Spanish III**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Spanish I, Spanish II

**Concurrent Credit:** UALR SPAN1312 Elementary Spanish II (2<sup>nd</sup> Semester Grade Only / 3 Hours)

The students should have a good foundation from typical Spanish I and Spanish II courses. This foundation will then be built upon as students gain continued mastery and knowledge of all verb tenses and related grammar topics. The course is topic-driven, using a variety of resources to help students communicate orally, aurally, and through reading and writing. Students will be exposed to culture through etiquette, history, art, literature, pop-culture and politics.

## **Spanish Level IV, Advanced Spanish Language and Literature**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** Spanish I, Spanish II, Spanish III

**Concurrent Credit:** UALR SPAN 2311 Intermediate Spanish (2<sup>nd</sup> Semester Grade Only / 3 Hours)

The students should have a good foundation from typical Spanish I, Spanish II, and Spanish III courses. This foundation will then be built upon as students gain continued mastery and knowledge of all verb tenses and related grammar topics. The course is topic-driven using a variety of resources to help students communicate orally, aurally, and through reading and writing. Students will continue to be exposed to culture through etiquette, history, art, literature, pop culture and politics. Students will be prepared to take a college placement exam. This course is equal to but not limited to the typical AP class for this level.

## **French I**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Concurrent Credit:** NPCC FREN1103 Beginning French I (1<sup>st</sup> Semester / 3 Hours)

NPCC FREN1113 Beginning French II (2<sup>nd</sup> Semester / 3 Hours)

French I is an introductory course for students who have had no prior experience in French or for those who lack sufficient skills to proceed to the next level of language study.

## **French II**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** French I

**Concurrent Credit:** UALR FREN 1311 Elementary French I (2<sup>nd</sup> Semester Grade Only / 3 Hours)

French II is designed for students who have advanced beyond the beginning level. Students should be able to converse and write about a variety of topics, including themselves and their families, school, shopping and dining experiences, the weather and some leisure activities. Students should be comfortable using a variety of regular and irregular verbs to express these ideas.

## **French III**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** French I, French II

**Concurrent Credit:** UALR FREN1312 Elementary French II (2<sup>nd</sup> Semester Grade Only / 3 Hours)

This course emphasizes development of conversational, listening, and writing skills. The ability to talk about events in the present, past, and immediate future is a minimum requirement for this course. Students will develop skills through a wide use of texts and media including newspapers, video, films, computer programs, the Internet and audiocassette supplements. *Students enrolled in French III are eligible for concurrent enrollment credit through National Park Community College.*

## **French IV**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** French I, French II, French III

**Concurrent Credit:** UALR FREN 2311 Intermediate French (2<sup>nd</sup> Semester Grade Only / 3 Hours)

This course emphasizes development of conversational, listening, and writing skills. The ability to talk about events in the present, past, and immediate future is a minimum requirement for this course. Students will develop skills through a wide use of texts and media including newspapers, video, films, computer programs, the Internet and audiocassette supplements. Students will be prepared to take the AP French examination.

## **German I**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** None

**Concurrent Credit:** NPCC GERM 1103 Beginning German I (1<sup>st</sup> Semester / 3 Hours)

NPCC GERM 1113 Beginning German II (2<sup>nd</sup> Semester / 3 Hours)

German I is an introductory course for students who have had no prior experience in German or for those who lack sufficient skills to proceed to the next level of language study.

## **German II**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** German I

**Concurrent Credit:** NPCC GERM 1104 Intermediate German I (1<sup>st</sup> Semester / 3 Hours)

NPCC GERM 1114 Intermediate German II (2<sup>nd</sup> Semester / 3 Hours)

German II is designed for students who have mastered German I content. Students entering the intermediate level should be comfortable conversing and writing about themselves, their families, their school and leisure activities, likes/dislikes, clothing, the weather, and rooms in a house. Students should be able to use a variety of verbs, including modal verbs, and future tense auxiliary to express their ideas. Students should have a solid understanding of nominative, accusative, and dative cases and their uses. Students should also have a rudimentary ability to communicate in the past tense.

## **German III**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** German I, German II

Advanced German Students should be able to discuss making travel plans, sending things by mail, airport activities, daily life and shopping in Germany. Students should have extensive knowledge of typical German foods, culture, and history. Students should be able to use all cases and both past tenses without great difficulty. Students should be able to describe using adjectives before a noun.

## **German IV**

**Credit:** 1

**Length:** 1 Year

**Prerequisites:** German I, German II, German III

Advanced German Students should be able to discuss making travel plans, sending things by mail, airport activities, daily life and shopping in Germany. Students should have extensive knowledge of typical German foods, culture, and history. Students should be able to use all cases and both past tenses without great difficulty. Students should be able to describe using adjectives before a noun. Students will be prepared to take the AP German examination.

## **Additional Courses**

### **Health**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

This course covers a variety of subjects including nutrition, stress management, alcohol awareness, and AIDS, etc.

### **Physical Education**

**Credit:** ½

**Length:** 1 Semester

**Prerequisites:** None

The focus is on life-fitness sports.

### **Band**

**Credit:** ½ fine art

**Length:** 1 Semester

**Prerequisites:** Previous experience or permission of instructor

This course develops and demonstrates the musical ability and talent of ASMSA students.

### **Choir**

**Credit:** ½ fine art

**Length:** 1 Semester

**Prerequisites:** None

Choir is a course that develops and demonstrates the vocal talent of ASMSA students. It is open to all students.