Upper School Course Catalog | 2021-2022

English

Department Mission Statement: By the end of their education at Atlanta Classical Academy, students will be able to encounter the world of a work of literature that an author has created on its own terms, entering into a meaningful conversation with the ideas expressed in that text in a way that will inform how they meet the inherent responsibilities they have to their own communities. Good reading leads one to acquire the mind of an author, good writing responds to the ideas of an author through expressing accurate analysis, and good questions situate us in human history and are essential in developing imaginative sympathies for mankind. Reading, writing, and discussing are the necessary components for pursuing truth and will engender in students the virtues of being good citizens and friends.

7th and 8th Grade Literature

The goal of these classes is to sit down at the table of an ongoing, great conversation and listen in on the voices of a few genius authors. Through the rich worlds and characters they create, we will find deep and difficult questions about human nature, and we will investigate the answers they propose to those questions. The characters of our texts will be the key to unlocking these universal human questions and motivations. In 7th grade, Guy Montag of *Fahrenheit 451* will ask us: "How long is it since you were really bothered? About something important, about something real?" We will read each work of literature with an attitude of

openness toward being "bothered" in the deepest sense of the word, because they will have much to show us about what is most fully real. In 8th grade, Atticus Finch of *To Kill a Mockingbird* will remind us that "You never really understand a person until you consider things from his point of view…Until you climb inside of his skin and walk around in it." We will follow Atticus's advice and approach each text with an eye towards knowing our characters deeply and critically exploring what moves them.

Course Texts: 7th Grade: *Fahrenheit 451, Cyrano de Bergerac, Romeo and Juliet, Frankenstein, Call of the Wild*. 8th Grade*: To Kill a Mockingbird, Lord of the Flies, Much Ado About Nothing, The Sea-Wolf, The Hobbit*.

Classical Literature (9th)

In this course, students will study the founding works of great literature. They will read Homer, the world's first great storyteller, Sophocles, a genius of tragedy, Virgil, perhaps the most talented poetic craftsman in history, and Shakespeare, the master of our own language. The goal is to engage with these great minds and participate in the worlds their stories create. Students will discover what makes these authors and their literature great. They will examine the questions they ask about human nature and begin to explore some of the answers they provide. Instead of racing through excerpted versions of these works, this course moves deliberately through complete texts, delving into them in great detail.

Course Texts: Homer's *The Iliad,* Sophocles' *Antigone* and *Oedipus Rex*, Virgil's *The Aeneid,* William Shakespeare's *Julius Caesar*

British Literature (10th)

In the opening lines of *Sir Gawain and the Green Knight,* the Pearl Poet cautions the reader that he enters a world "Where war and marvels / Take turns with peace, / Where

sometimes lightning trouble / Has struck, and sometimes soft ease." In this class, students explore the intersection of "wonder and woe," inquiring into the temperamental nature of man's fate. The course follows a standard, chronological survey structure of British Literature. It begins in the 14th century with the final days of courtly literature, moves through the cultural overhaul of 17th century Britain, encounters the Restoration Era and dawn of the novel, and concludes with the writings of Dickens in the midst of Queen Victoria's reign.

Course Texts: *Sir Gawain and the Green Knight,* Chaucer's *The Canterbury Tales,* Milton's *Paradise Lost,* Shakespeare's
Hamlet, Austen's *Pride and Prejudice*, Dickens' *A Tale of Two Cities*

American Literature (11th)

After studying the founding myths of our civilization in Classical Literature and the essential stories of our intellectual inheritance in British Literature, American Literature will afford students the opportunity to place themselves in "this soil, this air." Beginning with Walt Whitman's famous self-celebration, students consider the nature and formation of the American literary self as it emerges during the second half of the 19th century. Hawthorne's genre-bending *The Scarlett Letter* reflects on the early days of the American colonies in order to trace the formation of the American identity from its roots. In poetry and essays, Whitman, Emerson, and Thoreau articulate this project of forging an American literary identity, focusing on the natural world and its role in providing the language and freedom to write American books and live American lives. Next, because a period of exile is often essential to an understanding of self and homeland, students go to sea with Ishmael in *Moby Dick*. Mark Twain extends this theme of "journey away from home" in *The Adventures of Huckleberry Finn*. Students spend the second semester with three of the best writers the South has to offer:

William Faulkner, Flannery O'Connor, and Robert Penn Warren. Finally, for a break from the South's gothic tales, students will delve into the poetry of Emily Dickinson and Robert Frost at the close of the course.

Course Texts: Nathanial Hawthorne's *The Scarlet Letter,* Herman Melville's *Moby Dick,* Mark Twain's *The Adventures of Huckleberry Finn,* selected stories by Flannery O'Connor, Robert Penn Warren's *All the King's Men,* selected works by William Faulkner, selected poetry by Emily Dickinson, selected poetry by Robert Frost

Modern European Literature (12th)

Students finish the 11th grade year asking questions about human responsibility and the burdens of living in time. The 12th grade year expands this inquiry by examining how a free man navigates a world where every individual has already failed to fulfill his inherent responsibilities to his fellow man. The horror of this failure and the very burden of freedom compose this modern dilemma as authors wrestle with what it means to be in the world. The Modern European Literature Course will help students reconcile themselves with the implications of their own existence while providing a notion of redemption as they move towards fully exercising their freedoms in the wider world. In addition, students will spend the better part of second semester drafting and writing their senior theses, a capstone writing experience that pulls together the seminal questions of the Western Tradition.

Course Texts: Fyodor Dostoevsky's *Notes from Underground* and *Brothers Karamazov,* Albert Camus' "Myth of Sisyphus" and *The Fall,* selected poetry by T.S. Eliot

Composition

Writing is essential, and the ability to write well is the bedrock of academic success. Students write all the time, in their texts, emails, and journals, but writing in an academic setting carries its own rules. This course explores and explains how academic writing is

created. By incorporating model sentences, exemplary texts, imitative writing, and self-editing strategies, students gain knowledge and practice of the methods and skills necessary to create dynamic, logical academic prose. Students work through several modes of discourse including summary writing, narrative writing, definition essays, and memoirs, and work in tandem with their literature class on a major essay.

History

Department Mission Statement: Through the study of history at Atlanta Classical Academy, students will gain a knowledge of the major events, historical actors, ideas, and traditions which have shaped Western Civilization; the ultimate goal being a recognition of themselves as inheritors of this tradition and, as a result, uniquely burdened with the task of its preservation.

Seventh Grade History

In seventh-grade, students will learn about the late 19th Century and early 20th century world. They read primary sources on Victorian England, German Unification, the Second French Empire, Anarchy and Socialism, World War I, the Roaring 20s in the US, and the Great Depression. The course puts a focus on industrialization, the rise of new ideologies in the late 19th Century, and the course of events that follow. The course also looks at the important historical characters of the time period as well.

Eighth Grade History

Eighth-grade students pick up the story where they left off in seventh-grade. They read primary sources on the Great Depression, the New Deal, Fascism, Communism, the Second World War, the Cold War, the Civil Rights Movement, and Reagan years. The course puts a focus on ideology in the 20th Century, the Second World War, the Cold

War, change in the US, and the cause and effects of events. The course also looks at the important historical characters of the time period and their contributions to the events that took place.

Western Civilization I

Western Civilization I is the first of two sections of the high school European History curriculum. The purpose of this course is to provide students with an understanding of the origin and nature of Western Civilization. Although Western Civilization I principally covers the ancient Greeks in the Fall Semester and the ancient Romans in the Spring Semester, the curriculum also explores other contributors to our civilization, such as the Paleolithic and Neolithic societies and the ancient Celts and Germans. At the end of the year, students will be able to speak about the ancient world and its importance as our cultural progenitor.

Western Civilization II

Western Civilization II is a continuation of Western Civilization I. In Western Civilization II, the curriculum focuses on the ways the legacy of the ancient world was both transmitted and reshaped over the course of almost 2,000 years. In the Fall semester, the curriculum primarily explores Late Antiquity and the Early Middle Ages. In the Spring Semester, the focus shifts to the Later Middle Ages, Renaissance, and Enlightenment. Ultimately, students are expected to be informed about the intellectual, cultural and philosophical precepts upon which the Founding Fathers relied when setting forth on our American experiment.

History of the United States - 1600 to Present

This course offers a survey of the major themes and events in American history from colonial times through to the present day. The course delves deeply into the origins and

nature of American governmental institutions, and the traditions, habits, and presumptions which brought those institutions into being. As the class moves forward, there is a focus on the development of legal/governmental institutions, the development of political theories, conflicts over slavery which led ultimately to the Civil War, and the constitutional disputes and changes that conflict brought about. Special attention will be given to economic development, and the social and political stresses which urban growth and industrial expansion placed upon American institutions of government. Finally, the class will end with the 20th Century and beyond. Domestically, particular focus will be placed upon changing social patterns, including race relations and the Civil Rights movement, the post-1950s 'counter-culture' and radical 'New Left', and the origins of cultural and moral pluralism. The relationship of these social trends to shifting political philosophy, such as progressive centralization of power in the federal government and administrative agencies will be addressed. In foreign policy, special attention will be given to the World Wars and Cold War, events that led the United States into a new position of global leadership, and, eventually, military hegemony. Class time will be devoted as much as possible to active discussion of primary documents.

Modern European History - 1789 to Present

This readings-based, two-semester course surveys the major themes and events of European history since the late eighteenth century. Assigned texts will be primary sources from the eras under discussion, such as memoirs, speeches, essays, and the like. Successive modules will address the French Revolution; liberalism and the rise of the nation-state; imperialism and great power politics; the First World War; Communism, fascism, and democracy in the interwar decades; the Second World War; the Cold War; the European Union. Class sessions will consist of concise lectures, group discussions on primary sources, and occasional reading days.

American Government

The objective of this course is to prepare students for the rigors of citizenship by providing them with a basic knowledge of their government. Throughout this course, students should acquire a strong understanding of America's founding principles and the relationship of those principles to our safety, liberty, and happiness. They should come to know the American frame of government and how it is intended to operate under the U.S. Constitution. Students will also study challenges to our founding principles and the U.S. Constitution throughout our history, and aspects of American government as it functions today.

Economics

This course is a one semester introduction to the basic tools of micro- and macroeconomic analysis. Students will learn to identify, analyze, and evaluate the causes and consequences of individual economic decisions and public policy, including issues raised by the constraints imposed by scarcity, how economies and markets work, and the benefits and costs of economic interaction and interdependence. This course, more than anything, aims to introduce students to a new lens in which to view the world and individual human action. Students will analyze, reason, problem solve, and be able to make decisions specific to various roles, including that of consumer, producer, saver, investor, and responsible citizen—roles they will all take on throughout their lives.

Political Philosophy

Political philosophy is the attempt to obtain political knowledge based on an accurate understanding of human nature and human history. With political knowledge, political philosophers can understand how men act in society and thus create forms of government that will affect the people's safety and happiness. The Founding Fathers of the United States were political philosophers. Our objective is to read some important

texts the Founders used as references and by reading the Founders themselves in defense of the Constitution—in order to understand the Constitution of the 5 United States of America. As political philosophers ourselves, we will not only gain knowledge of our nation but also become better citizens and defenders of that Constitution.

Moral Philosophy

Moral philosophy, or ethics, is the formal study of right action. From infancy, we are told what is "right" and what is "wrong." What is the basis of such judgments? Do our duties to ourselves and to others derive from divine commands, social contracts, or principles of human nature? Do standards of right and wrong fluctuate according to time and place, or are there certain transcendent norms to which all human beings must adhere? To answer these questions and others, we study the moral tradition of the West. This is an exceedingly rich tradition, and this course examines many philosophers, statesmen, and storytellers. The overarching aim is to understand what constitutes the good and the virtues employed to achieve and to defend the good.
Course Texts: Aldous Huxley's *A Brave New World,* C.S. Lewis' *The Abolition of Man,* selections from various sources

Foreign Languages

Mission Statement

Arguably the faculty of language most clearly distinguishes human beings from animals. Although we use language all day and every day, rarely do we reflect on the sheer wonder of our ability to articulate sounds that communicate ideas to those around us. The study of how another speech community's use of language differs from one's own enhances not only one's understanding of the target language, but also of one's own

language, mastery of oral and written communication in which is critical to one's intellectual development.

The role of English as the *lingua franca* of the contemporary world puts native English speakers in an awkward position in terms of language study: everyone else in the world can study English to great benefit, but what language should English speakers study? Apart from the truism that the study of any foreign language contains inherent intellectual benefits and value, ACA offers the two languages that are of most importance to Americans: Latin and Spanish. The importance of the latter language is derived from the presence of a large community of Spanish speakers within the US. The significance of Latin comes from the fact that, although English has been enriched by borrowings from a multiplicity of languages, Latin has been uniquely influential on the development of English as we know it today, especially when one combines with the direct influence of Latin the indirect influence of Latin through French, a daughter Romance language.

The study of a language, of course, is not complete without paying appropriate attention to the culture of the speakers of that language. Cultural topics, accordingly, are an essential element of the curriculum.

Foreign language instruction begins at ACA with Spanish in 1st grade and continues through 4th grade. In 6th grade all students begin Latin and continue with it through 8th grade. At the beginning of 9th grade freshmen must decide whether to continue with Latin or begin Spanish. In high school there is a three year language requirement. A foreign language becomes an elective in 12th grade.

Latin I

Latin I is a two-year sequence, beginning in 6th grade and continuing into 7th. The textbook uses a reading-based approach to expose students both to a great deal of vocabulary and to progressively more complicated grammar. Ideally students will cover chapters 1-14 in 6th grade. These chapters introduce all noun cases and declensions, but only the present tense. 7th grade will begin with review of chapters 8-14, then continue on until chapter 20, covering such topics as the passive voice, imperfect and future tenses, and 1st and 2nd person verb forms.
Textbook: *Lingua Latina Per Se Illustrata* by Hans Orberg

Latin II

Latin II is regularly taken in 8th grade and begins with review of chapters 17-20 of the textbook. The remainder of the first semester is occupied with chapters 21-24. At the beginning of the second semester the students switch to a different textbook, *Wheelock's Latin*, in order to focus more on complicated grammatical topics, such as participles, infinitives, and indirect statements.
Textbook: *Lingua Latina Per Se Illustrata*
Wheelock's Latin, 7th Edition

Latin III

Latin III is regularly taken in 8th grade and covers the final third of the *Wheelock* textbook (chapters 28-40). These chapters mostly cover the formation and various uses of the subjunctive mood, but also include such topics as conditions and gerunds.
Textbook: *Wheelock's Latin*, 7th Edition

Latin IV

Latin IV is regularly taken in 10th grade. After finishing any remaining chapters in the *Wheelock* textbook, students then return to the *Lingua Latina* textbook of Latin I and II

in order to complete chapters 25-35. The textbook by this stage serves as an intermediate reader, as the students will already have covered all the major grammatical topics of Latin.

Textbook: *Wheelock's Latin*, 7th Edition

Lingua Latina Per Se Illustrata by Hans Orberg

Latin V

Latin V is typically for 11th graders or very advanced sophomores. The overarching goal of this course is to increase the pace at which students can translate a high volume of Latin writing. To this end, more readily comprehensible compositions are initially utilized to help the students develop good techniques of translation. These are then applied toward more difficult un-adapted passages from the classics of Latin literature. Students begin the AP curriculum in the second semester with Caesar's account of his conquest of Gaul.

Textbook: *Caesar: Selections from his de Bello Gallico,* Hans-Friedrich Mueller

AP Latin (Latin VI)

The seniors (or advanced juniors) in AP curriculum first complete the translation of the passages of Caesar's *De bello Gallico* on the AP curriculum, and then begin the AP curriculum for Virgil's *Aeneid*, which includes passages from books I, II, IV, and VI.

Textbook: *Virgil's Aeneid*, Clyde Pharr

Caesar: Selections from his de Bello Gallico, Hans-Friedrich Mueller

Latin VII

Seniors who do not wish to take AP Latin may instead opt for Latin VII, the curriculum for which changes according to the preferences of the instructor and students.

Textbook: rotating curriculum

Spanish I

This course immerses students in the Spanish language by implementing different activities that help with language development. Students work on developing the four language skills (listening, speaking, reading, and writing), as well as the vocabulary and basic grammar necessary to establish a basic working knowledge of the language. Students will learn introductions, seasons, days of the week, months of the year, numbers, prepositions, adjectives, comparatives, superlatives, regular/irregular verbs, among others. Additionally, students will learn the simple present tense and basic grammatical structures which will help them communicate efficiently in basic conversational Spanish.

Course Texts: *Spanish: Middle/High School* by Cynthia Downs

Spanish II

In this course, students will work to further develop the four Spanish language skills (listening, speaking, reading, and writing), as well as vocabulary and advanced grammar necessary for them to acquire a working knowledge of the language. Students will build upon previous topics taught in Spanish I (numbers, colors, animals, adjectives, comparatives, superlatives, regular/irregular verbs, present tense). Additionally, we will continue studying verb tenses, more advanced grammatical structures, and new vocabulary that will help students communicate efficiently and advance their understanding of the Spanish language.

Course Texts: Christopher Kendris' *Spanish Now! Level 2,* Virginia Hildebrandt's *Las Lagrimas de Xochitl*, Craig Klein Dexemple's *Peter va Colombia*

Mathematics

Department Mission Statement:
Like all true liberal arts, an education in mathematics aims for the cultivation of intellectual and moral virtue. This aim does not negate or ignore the very practical applications of math, but it does reach for a higher and more humane goal. As we learn about the rules, patterns, and theorems of math classes, our hearts and minds become attuned to the rules and patterns in our world. We begin to recognize that we live not in *chaos*, but in a *cosmos* (an ordered universe) filled with patterns. Ordered thoughts and ordered affections lead to happiness. As humans, we also love patterns because they are beautiful to behold. They contain an element of mystery and cause us to wonder 'why is this pattern here?' and 'what other patterns may be hiding just beneath the surface?' Such questions require a curious mind and a patient diligence to ask and to answer. Therefore, we find that Order, Beauty, and Wonder are the principal ends of a mathematics education.

Algebra I

In Algebra 1, students are invited to observe the wonder of mathematics as they learn to apply their concrete mathematical knowledge to formulate abstract algebraic generalizations. Classical tools such as the five common topics of discovery and Socratic discussions will be employed to provide students with a more comprehensive understanding of mathematics. The beauty of algebra is revealed as students begin to understand it as a language that describes so many aspects of the world around us. The Algebra 1 textbook is rich with problem-solving challenges and strategies that encourage critical thinking skills. Engaging lessons will explore solving equations and inequalities, simplifying expressions, linear, exponential, and quadratic functions, exponents, polynomials, factoring, radicals, data analysis, and probability.

Geometry

Geometry at ACA remains consistent to its classical approach in the search for reason, beauty, and knowledge for its own sake. Euclidean geometry carefully defines the relationship of points, lines, planes, and space, which allows students to utilize deductive reasoning to present a clear argument. Plato claimed that "Geometry draws the soul towards Truth" and this class reflects that resilient desire for learning what is true and what only appears to be. Topics covered include perpendicular/parallel lines, similar figures, triangles, and coordinate geometry.

Algebra II

Algebra II is a year-long course that is designed to provide students opportunities to build understanding of important, new mathematical concepts and develop fluency with key skills. Algebra II builds on Algebra I concepts by reviewing previously learned concepts and expanding depth of knowledge by presenting new ideas and more complex problems. Student's build upon the foundation laid in the study of Algebra I and Geometry, continuing to explore linear, quadratic, polynomial, rational and radical functions, while introducing trigonometric, exponential, and logarithmic functions. Conic sections, probability, statistics, and matrices will also be examined, and some discussion of the history of algebra and mathematics in general will be included. Classical tools such as the five common topics of discovery and Socratic discussions will be employed to provide students with a more comprehensive understanding of mathematics.

Advanced Mathematical Decision Making (AMDM)

The Advanced Mathematical Decision Making (AMDM) course will give students further experiences with statistical information and summaries, methods of designing and conducting statistical studies, an opportunity to analyze various voting processes,

modeling of data, fundamental financial decisions, and use network models for making informed decisions. Instruction and assessment should include the appropriate use of manipulatives and technology. Students will extend their understanding and use of ratios, proportions to solve problems involving decision-making. Vectors and matrices are employed for solving problems. Students will explore representations of data and models of data as tools in decision-making.

Statistical Reasoning

Statistical Reasoning provides experiences in statistics beyond the GSE sequence of courses, offering students opportunities to strengthen their understanding of the statistical method of inquiry and statistical simulations. Students will formulate statistical questions to be answered using data, will design and implement a plan to collect the appropriate data, will select appropriate graphical and numerical methods for data analysis, and will interpret their results to make connections with the initial question. The Standards for Mathematical Practice through a Statistical Lens will provide the foundation for instruction and assessment. Topics should be introduced and assessed using simulations and appropriate supporting technology.

Precalculus

Precalculus is designed to finalize the study of concepts introduced in previous classes. As the final step before the collegiate level, precalculus acts as the bridge between elementary and higher mathematics and, as such, contains a healthy dose of both familiar and new concepts. Many algebraic, geometric, and logical reasoning skills acquired in previous classes will be strengthened and refined this year. In addition, this class will contain an emphasis on the study and applications of trigonometry. Additional topics are also covered, including alternate graphing methods, vectors, matrices, discrete mathematics, and limits.

Calculus I

Calculus I introduces the concepts of calculus in both theory and application. This course emphasizes an intuitive approach to calculus, where students analyze the concepts geometrically, numerically, analytically, and verbally. The calculus is split into two branches—differential and integral calculus. In differential calculus, students learn the rules of derivatives and some of their applications: including the analysis of curves, modeling and optimization, and the relationship between position, velocity, and acceleration. In integral calculus, students study the Fundamental Theorem of Calculus and rules of basic integration, along with methods to find areas under curves and volumes of irregular figures. Both of these branches take an in-depth study of how we wrestle with infinity, limits, and the comparison of the One to the Many.

AP Calculus BC

Students will be introduced to the fundamental principles of differential and integral calculus. Topics covered include detailed study of limits, continuity, derivatives and integrals of algebraic and transcendental functions of one variable with applications to curve- tracing, maxima-minima related rate problems. Upon completion, students should be able to select and use appropriate models and techniques for finding solutions to derivative and antiderivative-related problems with and without technology. Students will have the opportunity to take the AP exam at the end of the course, if they choose, with the possibility of qualifying to meet college-level credit requirements depending on the policies of the college in which the student enrolls.

Science

Department Mission Statement

"To conceive, understand and grasp the whole symmetry of the scientific edifice…is equivalent to tasting that enjoyment only conveyed by the highest forms of beauty and truth." This quote from Dmitri Mendeleev, who was the initial architect of the periodic table, conveys the essence of what we aim to accomplish in our science classrooms at ACA. Our ultimate goal is to build students' knowledge about how and why the natural world works, so that they may come to appreciate and love the inherent beauty and truth of our universe. Students learn through a combination of traditional lecture about and hands-on exploration of enduring scientific laws, principles, and phenomena. Historical reflection about important scientists allows students to make connections between the successes and failures of humans and their determined pursuit of natural truths. Through their studies, our students also grow to appreciate the uniqueness and fragility of our planet, which cultivates a sense of global stewardship. Science can orient us in the world, and help explain how we fit into its grand story. We endeavor to graduate discerning citizen scientists who understand and appreciate the truth and beauty of the natural world.

Biology I

Biology I expands on the life science concepts acquired in earlier courses. Students will explore a diversity of topics, including the inner workings of the cell and DNA, and the interactions of ecosystems to gain a deeper understanding of how life systems operate. This course aims to open students' eyes to the world growing in and around them; to help them understand what makes life work, and how they fit into it.

Course Texts: Various Authors' *Campbell Essential Biology with Physiology*

AP Biology

The Advanced Placement (AP) Biology course builds on the concepts acquired in Biology I and is a rigorous, year-long course that simulates a college-level introductory biology course. Students will expand upon the knowledge acquired in Biology I and develop an understanding of the principal concepts in biology in addition to experiencing science as a process of problem solving and discovery. Lab work emphasizes development and testing of a hypothesis, collection, analysis and presentation of data, and discussion of results to discover unanswered questions about the particular topics addressed.

Course Texts: Various Authors' *Campbell Biology*, AP Edition, Fred W. Holtzclaw and Theresa Knapp Holtzclaw's

Campbell Biology Active Reading Guide, AP Edition

Chemistry I

Chemistry I provides students with a fundamental understanding of matter and change, scientific measurements and procedures, atomic structure, bonding, chemical formulas, chemical reactions and equations, stoichiometry, states of matter, kinetic theory of matter, gas laws, solution chemistry, acid-base theories and reaction energy. Each major unit includes a historical perspective, focusing on the questions posed, analyzed and answered by the founders of modern chemistry. Students will do a number of laboratory experiments and investigations.

Course Texts: Mickey Sarquis and Jerry L. Sarquis' *Modern Chemistry*

AP Chemistry

AP Chemistry is designed to be comparable to a college-level general chemistry course, and thus explores in much greater depth the concepts students previously learned in Chemistry I, as well as new material. Major topics covered will include the structure of

matter, states of matter, chemical reactions, kinetics, thermochemistry, equilibrium, acid-base, and electrochemistry. Students will learn numerous chemical calculation skills in the study of the content, and in the analysis of lab data. The course is challenging in both academic content, mathematical calculations, and laboratory procedures.

Course Texts: Steven S. Zumdahl, Susan A. Zumdahl, and Donald J. DeCoste's *AP Chemistry*

Physics I

This course is designed to further the understanding of the physical sciences that began in the lower school and provide students with the necessary skills to be proficient in physics. The study of physics stresses an in-depth understanding of the nature and structure of matter and the characteristics of energy. This course is designed to provide students with hands-on, real-world connections that will deepen their appreciation of mathematics as the language in which nature is written in. Areas of concentration include classical mechanics, gravitation, thermodynamics, and sound waves. Electromagnetism, optics, quantum mechanics, and relativity will also be considered.

Course Texts: Raymond A. Serway and Jerry S. Faughn's *Physics*

AP Physics

AP Physics 1 is an algebra-based, college-level physics course designed to build upon and deepen the students' understanding of the foundational laws of physics. We study 'the nature of things,' acknowledging that reality exists outside of ourselves; it is a sign of virtue to recognize and appreciate a thing according to *its* nature rather than simply for our perception of it. We will focus on the following five Big Ideas: (1) Objects and

systems have certain properties such as mass and length. (2) Fields existing in space can be used to explain interactions. (3) The interactions of an object with other objects can be described by forces. (4) Interactions between systems can result in changes in those systems. (5) Changes that occur as a result of interactions are constrained by conservation laws.

Course Texts: College Physics, AP Edition (Serway)

Physiology

This is a year-long course which will focus upon the structures and functions of the human body. The organization of the human body, the support and movement of the human body, regulation and maintenance of the human body, and the control systems of the human body will be explored. This is a lab-orientated course that will use dissection, physiology experiments, case studies, and lectures to learn the structure and function of the human body.

Computer Science IA

The English word *computer* comes from the Latin *computare*, which means to calculate or to add together, but computers today are more than just giant calculators. This course explores the foundations of modern computing, covering a broad range of topics including how information is stored (data representation), how we put computers to work (algorithms), how we tell computers what to do (programming), and how we keep information secure (encryption). Computer Science IA is a prerequisite for Computer Science IB and AP Computer Science.

Computer Science IB, Introduction to Programming

In Computer Science 1A students learned how computers and the internet work. Computer Science 1B is designed to be a continuation of Computer Science 1A, with a focus on programming. The class will start with beginner-friendly tools to try out programming concepts making games, graphics, and simulations. Students will then dive right into languages used in colleges and tech companies. Fundamental programming techniques are covered, including data types, variables, functions, loops and conditional logic. Object-oriented programming in Java will be introduced.