



Loudoun School
for Advanced Studies

Course Catalog 2022-2023



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Introduction

At Loudoun School for Advanced Studies (LSAS), we offer a range of academic courses that are designed to be rigorous, engaging, and rewarding.

First, we offer what might be characterized as “traditional” courses across subjects, so students can fulfill graduation requirements comparable to those in public school districts and so they can transition into and out of LSAS with continuity in math, English, history, science, and foreign language courses. Given our small class sizes and expert faculty, even these traditional courses are seminar courses with discussion and depth.

We also offer a range of Advanced Placement courses, so colleges can benchmark our students against the national student population in subjects like Calculus, Physics, Chemistry, and Literature, during the admissions process. And, in some cases, students can earn college credit with high AP test scores.

Finally, and perhaps most importantly, we offer our Signature Courses. These topic-driven courses emulate the experience of an advanced college seminar: we explore a specialized subject with high-level material, open-ended discussion, challenging assessments, and cumulative projects. Signature Courses are designed to show how rich and compelling deep learning can be. They reflect both the expertise of our teachers and the intellectual ambition of our student body. We believe that no other secondary school in the region offers comparable courses, with the focus and rigor of college course-work. By delving into complex topics, students build a real love of inquiry, overcome their fear of uncertainty, and discover their intellectual independence.

LSAS Signature Courses offered during the 2022-2023 school year include:

- [How Civilizations Form: Reimagining Human Freedom](#)
- [Linear Algebra with Applications](#)
- [Ecology](#)
- [Ecological Design](#)
- [Independent Science Research](#)
- [Family Stories in the Graphic Novel](#)
- [Narratives of the American Experiment](#)
- [Current Events and Historical Contexts](#)
- [Political Leadership](#)
- [Game Theory and Probability](#)
- [Topics in Computer Science](#)
- [Financial Planning and Literacy](#)
- [The Films of Christopher Nolan](#)
- [Public Policy Seminar](#)
- [Reasoning about Complex Everyday Questions and Decisions](#)

Mathematics

Pre-Algebra (full year)

Susanne Blaya

Pre-algebra encompasses the study of integers, proportional reasoning, order of operations, expressions, and equations. This course emphasizes mathematical concepts with real-world applications. While learning the language of algebra, students will develop critical thinking skills and problem solving skills. This course also highlights effective class participation and study skills.

Algebra Explorations (full year)

Susanne Blaya

In Algebra Explorations, students will be introduced to algebra concepts through both theory and applications. Students will continue to build number sense and practice computation, proportional reasoning, and applications with rational numbers. Modeling and real-world problems are woven in throughout this course.

Algebra 1 (full year)

Susanne Blaya

Algebra 1 is designed to give students a foundation for all future math courses. In this course, students will learn to use variables to represent unknown quantities in order to solve algebraic equations and inequalities. Modeling and problem solving are at the heart of the curriculum. Mathematical modeling consists of recognizing and clarifying mathematical structures that are embedded in other contexts: students express a situation in mathematical terms, use mathematical strategies to reach a solution, and present the solution in the context of the original problem. Students must be able to solve practical problems by representing and analyzing the situation using symbols, graphs, tables, or diagrams.

Geometry (full year)

Susanne Blaya

Geometry is primarily the study of spatial relationships with a principal focus on two-dimensional and three-dimensional space. We will begin with lines and angles and then progress to various families of shapes and their relationships: triangles, quadrilaterals, circles, etc. Besides understanding fundamental concepts, we will also look at how objects change as they undergo various transformations: translations, rotations, reflections, and dilations. Our emphasis will be on building students' confidence in problem solving and persevering when challenged with difficult problems.

Algebra 2 (fall semester)

John Kim

Algebra 2 provides students with a foundation for upper-level mathematics by incorporating mathematical reasoning, communication skills, and increasingly sophisticated real-world problems. Students will learn to manipulate more advanced mathematical functions and algorithms. Quadratic functions are thoroughly investigated, including graphing and multiple methods of solving, which require an introduction to complex numbers and advanced algebraic techniques. Real-world applications will be investigated by modeling of quadratic functions. Students will also explore rational functions and master working with radicals and rational exponents.

Trigonometry (spring semester)

John Kim

In this course, students will learn trigonometric functions and explore their applications in real-life problems. We will analyze, graph, and solve trigonometric functions. In order to improve logical thinking and mathematical reasoning, this course will emphasize the verification of trigonometric identities using all of the fundamental trigonometric identities.

Precalculus (fall semester)

John Kim

Precalculus applies advanced data analysis techniques to working with a variety of functions. Students will examine conic sections as well as logarithmic, exponential, and polynomial functions. Sequences and series will also be explored. Students will strengthen their conceptual understanding of problems and their ability to apply mathematical reasoning in solving problems. We will consider numerical, graphical, and algebraic solutions for all functions and discuss when each of these solutions is applicable. The course's focus on problem solving is enhanced with the use of technology.

Foundations in Calculus (spring semester)

John Kim

This course is designed to prepare students for Advanced Placement Calculus and SAT Math subject level exams. Students use symbolic reasoning and analytical methods to represent mathematical situations, express generalizations, and study mathematical concepts. Students also connect ideas in algebra, geometry, probability, statistics, trigonometry, function families, and graphing. Students will use concrete, numerical, algorithmic, graphical tools and technology to model functions and equations.

AP Calculus AB (full year)

John Kim

This course teaches students to approach calculus concepts and problems when they are represented graphically, numerically, analytically, or verbally and to make connections among these

representations. Calculus concepts will be applied to the functions students have studied the past few years. The real-world applications of calculus will be explored using derivatives, integration, and differential equations. Students learn how to use technology to solve problems, experiment, interpret results, and support conclusions.

AP Calculus BC (full year)

John Kim

AP Calculus BC is roughly equivalent to both first- and second-semester college calculus courses. It extends the content learned in AB to different types of equations (polar, parametric, vector-valued) and new topics (such as Euler's method, integration by parts, partial fraction decomposition, and improper integrals), and introduces the topic of sequences and series. The AP course covers topics in differential and integral calculus, including concepts and skills of limits, derivatives, definite integrals, the Fundamental Theorem of Calculus, and series.

Introduction to Mathematical Reasoning: Proof & Logic (fall semester)

David Romero

This course is designed to help students develop their mathematical reasoning ability and, in particular, their ability to read and write proofs. Elementary logic is introduced to familiarize students with the various forms of mathematical statements. Set theory will be explored throughout the course as it serves to illustrate many of the points of logic used in proof construction.

Linear Algebra with Applications (advanced, full year)

David Romero

Linear Algebra is a foundational subject in mathematics that is rich in both applications and geometric beauty. This course uses an inquiry-based approach. To paraphrase our main text, the course is structured to provide opportunities to be creative and practice ways of thinking conducive to creativity. The "application" portion of the course is designed collaboratively with students based on their background and interests.

Prerequisite: Precalculus.

Science

Middle School Courses

Earth and the Environment (full year)

Ashley Gam

Students in grade 6 will examine our living environment, with particular attention to our atmosphere and factors that influence it. We will examine weather processes, the biochemical processes of photosynthesis and cellular respiration, and how humans influence climate. This course emphasizes knowledge building (of important physical and biological phenomena) through

questions, investigations, data collection, group discussion, and the communal development of scientific models.

Ecology and Evolution (full year)

Ashley Gam

In this course, we examine processes underlying genetic inheritance, cellular growth, evolution, and ecosystem dynamics. Students in grade 7 will continue to build skills of experimentation, discourse, and the use of scientific models. Each semester, students will work in groups to develop and carry out a student-designed experiment.

Physical Science (full year)

Students in grade 8 will be introduced to topics in physics, chemistry, and engineering. Topics covered will include motion, atomic theory, and energy. Lab skills and engineering practices will be spread throughout the course. The goal of the course is to improve students' understanding of the physical world and expand their scientific curiosity.

High School Courses

There is no prescribed sequence, but take the following into account:

- Students interested in the life sciences should plan to take Chemistry before Biology to get the most out of the course.
- Students interested in physics, mechanical engineering, or electrical engineering should plan on taking an introductory physics course early. This will allow for more advanced electives early on. Either Conceptual Physics or AP Physics 1 will fulfill the physics requirement.
- Conceptual Physics is offered in alternate years.

Biology (full year)

Ashley Gam

In this course, we will examine major themes of biology: biochemistry, genetics, physiology, evolution, and natural selection. Modeling of biological processes, reading of scientific literature, formal scientific writing, discourse, biological techniques, and data analysis will be practiced and developed throughout the year.

Chemistry (full year) [Not offered in 2022-23.]

This course is intended to help students realize the important role that chemistry plays in the world around them and to provide a solid foundation in chemistry. Topics to be studied include: the structure of matter, chemical nomenclature, energy, phase changes, stoichiometry, acid-base chemistry, oxidation and reduction, precipitation, gas laws, nuclear chemistry, and other topics as time allows. Students will perform experiments whenever possible.

Math prerequisite: Algebra 1.

AP Physics 1 (full year)

David Romero

The philosophy and routines in this course are very similar to Conceptual Physics, since they are both introductory courses. However, this course covers much more material, and the workload is higher. More attention is paid to mathematical rigor and methods. This is the course for students especially interested in physics. See the College Board website for an outline of topics.

Math prerequisite: Algebra 1 and Geometry.

Conceptual Physics: Mechanics (fall semester) [Not offered in 2022-23.]

David Romero

The goal for this course is for students to critically analyze information and generate new knowledge. Students will develop certain scientific abilities, or habits of mind, as they practice “thinking like a physicist.” For pedagogical purposes, we will focus on topics that are relatively simple. For aesthetic purposes, we will focus on those topics considered fundamental to our understanding of nature. The fall semester will focus on mechanics, which attempts to describe how objects move and interact. Conceptual Physics is a gentler introduction to physics. It can serve as a good foundation for either AP Physics 1 (Algebra-based) or other electives such as Astronomy. *Students in this course must take Conceptual Physics: Light & Electromagnetism in the spring.*

Conceptual Physics: Light & Electromagnetism (spring semester) [Not offered 2022-23.]

David Romero

This course builds upon the fundamentals learned in the first semester’s Conceptual Physics course and also studies some special topics. Waves are covered with a focus on electromagnetic waves (i.e. light). Applications covered include optics, human vision, and astronomy. Electromagnetism is covered with an introduction to fields as a mechanism for understanding electric circuits, the power grid, and the Earth’s magnetic field. Because these topics are not covered in AP Physics 1, this course can be taken by those students who are interested in these topics. Based on enrollment and interest, we may offer an advanced version of this class in the future.

Additional High School Science Courses

AP Physics C: Mechanics/AP Physics C: Electricity and Magnetism (full year)

David Romero

AP Physics C is a calculus-based, college-level physics course, which is especially appropriate for students planning to specialize or major in physics or engineering. The mechanics portion explores topics such as kinematics; Newton’s laws of motion; work, energy, and power; systems of particles and linear momentum; circular motion and rotation; oscillations; and gravitation. The electricity and

magnetism portion focuses on electrostatics; conductors, capacitors, and dielectrics; electric circuits; magnetic fields; and electromagnetism. Due to the fast-paced nature of this course, students must have successfully completed an introductory calculus course before enrollment.

Math Prerequisite: AP Calculus AB.

Prerequisite: AP Physics 1 (or instructor permission).

Ecology (fall semester)

Ashley Gam

The course examines fundamental principles of ecology within the context of our local environment. We will study multiple habitats within Loudoun County, identify species, and figure out how we impact these systems. The final project will be a poster presentation to the school based on our research.

Prerequisites: Biology and Chemistry.

Ecological Design (spring semester)

Ashley Gam

This is a project-based class that leverages our understanding of local ecosystems and how we are changing them. We will identify an issue that we want to address, conduct research, and develop a tangible solution.

Prerequisites: Biology, Chemistry, and Ecology.

Scientific Reading, Writing, and Research (advanced, fall semester) [Not offered 2022-23]

Ashley Gam

How do scientists share their results and find new questions to explore? Students will identify an area of scientific interest, read articles to understand the relevant background material as well as current research in that area, and finally, develop a novel hypothesis. The final project will be a 5-10 page background paper that summarizes the current state of understanding of the topic and outlines the rationale for the new hypothesis.

Juniors and seniors only

Independent Science Research (advanced, fall and spring semesters)

Ashley Gam

Students who developed an independent research project in Reading, Writing, and Research can take this class if they want to do their experiment. They will plan a detailed experimental protocol and then will conduct their experiment. Students are strongly encouraged to take this course for at least two semesters to be able to finish their research. In addition to doing the research, students are expected to regularly present their progress in lab meetings. At the culmination of the research, students will prepare a poster presentation for the LSAS community and write a final scientific paper describing their experiment and its results.

Prerequisite: Reading, Writing, and Research.

English/Language Arts

Middle School Courses

Middle School English courses provide students with a foundation of skills upon which to build their advanced English coursework at LSAS and beyond. Through both writing and discussion, students practice close reading skills and learn how to use textual evidence to build support for their claims. Students produce several formal essays that they take through the full writing process, culminating in polished works to be added to their digital portfolios. Socratic seminar is another key component of these courses: students learn and practice speaking, listening, and self-awareness habits in discussions, so as to gain the tools key to building productive dialogue in any setting.

Exploring Identity (full year)

Sarah Derr

This course explores how our identities develop, whether through self reflection, treatment by others, or new experiences. *How are our identities formed? How are we shaped by our experiences and cultures? How much are we and others capable of making change?* Through reading, writing, and discussion, students will explore these and other essential questions. Major units/texts will include the personal narrative essay, “Characters Who Change” multi-genre unit, *The Wednesday Wars* by Gary Schmidt, “Education and Technology” research unit, and *Percy Jackson and the Lightning Thief* by Rick Riordan.

The Search for Belonging (full year)

Sarah Derr

This course builds on our previous explorations of identity and looks at our relationships with groups. *How are our identities shaped? How does identity affect our relationships with others and vice versa? What are examples of inclusion and exclusion in our communities, and how can we work to be more inclusive?* Through reading, writing, and discussion, students will explore these and other essential questions. Major units/texts will include “The Need to Belong” multi-genre unit, *Brown Girl Dreaming* by Jacqueline Woodson, *Lord of the Flies* by William Golding, “Branding” research unit, and *The Tempest* by William Shakespeare.

High School Courses

Myth, Epic, and Drama (fall semester)

Dan Clinton

In this course, we will read texts that look backward to a legendary past, where heroes struggle with monsters (or perhaps become monsters themselves). Myths and epic poems were defining texts for the cultures that produced them, so we will ask fundamental questions: What did these stories

mean to their original audience? What do they reveal about the values and beliefs of these communities? And why are we still reading them now? At the same time, students will learn to read and analyze poetic narrative, whether that means a long poem such as *Beowulf* or a verse drama such as *Macbeth*. Students should expect a creative project in the first quarter and an analytic paper in the second quarter. Readings include Neil Gaiman's *Norse Mythology*, *Beowulf* (translated by Seamus Heaney), and Shakespeare's *Macbeth*.

Family Stories in the Graphic Novel (fall semester)

Dan Clinton

In this course, students will read prose fiction alongside a series of graphic novels that explore family dynamics. In *Persepolis*, for example, Marjane Satrapi recounts her childhood in the aftermath of the Iranian Revolution. Students will analyze narrative structure, compare verbal and visual storytelling, and make comics of their own. This course will double as a coming-of-age story for the medium of comics, which began as disposable entertainment for children before evolving into a part of mainstream literary culture. The readings will range between personal memoirs and works of fiction with fantastical elements. We will read works by a diverse group of artists, including Art Spiegelman, Chris Ware, Marjane Satrapi, Mariko Tamaki, Sloane Leong, and others.

AP Literature and Composition (full year) [Not offered 2022-23.]

Dan Clinton

This course is designed to prepare students for the exam in AP English Literature and Composition. Students will learn to interpret works of literature at a college level, attending to structure, theme, and the expressive use of language; they will also become familiar with key literary devices and critical terms. Students should expect this class to be both reading and writing intensive. We will invite students to enroll based on the quality of their written work and their demonstrated ability to participate in a seminar setting.

AP Language and Composition (full year)

Dan Clinton

This college-level course is designed to prepare students for the exam in AP English Language and Composition. Organized around three units (rhetorical analysis, argumentation, and synthesis), AP Language introduces students to nonfiction texts from 18th-21st century American and British authors. Students should expect this class to be both reading and writing intensive.

Social Science

Middle School Courses

Narratives of the American Experiment (full year)

Jim Percoco

In this course, students will read a variety of age-appropriate books that reflect pivotal moments in US History. Students will engage in thematic analysis of the story of the United States based on historical narratives including (but not limited to) *Never Caught: The Story of Ona Judge*, *Tillie Pierce: Teenage Eyewitness to the Battle of Gettysburg*, *Hiroshima*, and *Moonshot*. Student engagement and participation are expected, and students will need to have a composition book for journal reflections. Field trip opportunities will augment classroom experiences.

Current Events and Historical Contexts (fall semester)

Kevin Oliveau

We live in interesting times. We are confronted by multiple ongoing crises at the national and international level: COVID, the war in Ukraine, climate change, economic instability (inflation, looming recession), increasing political polarization, and the Jan. 6th Insurrection. In this class, we will keep up with the news, primarily using *The Economist* magazine as our main source, supplemented by others. We will also review previous history, science, technology, and macroeconomic theory to provide context for these topics.

High School Courses

United States History (full year)

Jim Percoco

This will be a year-long chronological study of the United States, in which students will examine a variety of themes tied to the American experience. The course's time frame will run 1607-present, and students will explore both the triumphs and the travesties that are part of the American narrative. Students will be expected to think and write critically about a range of topics in American history. The focus on writing will include the composition of a fully MLA documented research paper. Student engagement and participation are expected, and students will need to have a composition book for journal reflections. Field trip opportunities will augment classroom experiences.

World History (full year)

Kevin Oliveau

This high school World History course will cover the story of humanity from the Ancient World to the present. Content will cover the Rise of Civilization, the Ancient World, the Middle Ages, the Renaissance, the Age of Reason, and the Modern World. The course will be global in outlook and not just a survey of Western Civilization.

Political Leadership (fall semester)

Jim Percoco

In Political Leadership, students will investigate James McGregor Burns's theory of transformative leadership: that is, the ability of leaders to create other leaders who serve the common good. A particular focus will include the presidencies of Abraham Lincoln, Ulysses S. Grant, Theodore Roosevelt, Franklin Roosevelt, and Lyndon Johnson. Additionally, students will examine the role of grassroots political leadership as demonstrated by the Civil Rights Movement, studying the life and work of Fannie Lou Hammer.

(Middle school students may take this course with instructor permission)

How Civilizations Form: Reimagining Human Freedom (Advanced) (spring semester)

Deep Sran

Using *The Dawn of Everything* and other texts, this course will question the conventional wisdom about how civilizations formed, and what that might teach us about human freedom in organized societies. This will be an advanced course with considerable reading. We will begin with *The Dawn of Everything* and then read sources cited therein to evaluate the authors' theory challenging the established view of the role of agriculture and the centralization of power in the rise of civilizations, and the associated assumption that humans must abandon their fundamental freedoms when organizing into societies. Students will have a chance to examine multiple civilizations across the globe spanning thousands of years of human history, including explorations of important archaeological sites that have received scholarly attention only recently. This course is designed to help students better understand the choices that underlie their current civilization and what choices still remain open.

Foreign Language

Spanish

Introduction to Foreign Language (full year)

Niels Christensen

This is an introductory basic course to both the Spanish language and the cultures where the Spanish language is spoken. This course is designed for students beginning World Language in middle school. Students will develop listening comprehension and oral communication skills at a comfortable pace. This course is not for a high school credit.

Spanish 1 (full year)

Niels Christensen

This is an introductory course to both the Spanish language and the cultures where Spanish is spoken. This course aims to develop basic and intermediate communicative skills in Spanish as a second language and to build basic knowledge about the cultures of the Hispanic world. This

course emphasizes fundamental grammatical structures and the acquisition and assimilation of practical vocabulary in conjunction with the development of the four language skills: writing, reading, speaking, and listening. The use of audio and visual materials in class helps students develop listening and speaking skills, enabling them to express themselves in Spanish from the start of the course.

Spanish 2 Beginners/2 Intermediate (full year)

Niels Christensen

This class is a continuation of the first-year course. Contrary to Spanish 1, by the spring semester, this course is conducted primarily in the target language. Supplementary readings and other materials are introduced to broaden cultural understanding and language capabilities. Conversational language is emphasized. At the intermediate level, we will focus on more advanced grammatical structures and the continuation of acquisition and assimilation of more precise vocabulary in conjunction with the development of the four language skills: writing, reading, speaking, and listening.

Spanish 3 (full year)

Niels Christensen

Though at a faster pace and more rigorous than Spanish 2, the objectives of this course are identical to those of Spanish 2; however, this course is for students who have already studied Spanish 2 and display a good understanding of the language, but who are not sufficiently prepared for Spanish 4, needing more grammatical instruction. The first half of *Descubre 3* is used as the third-year program in an articulated sequence of instruction. The course will continue to emphasize conversational language, but will introduce longer and more complex supplementary readings, videos, and other materials.

Spanish 4/5 (full year)

Niels Christensen

This course is designed to enhance the Spanish language learning process through exposure to historical, cultural, literary themes as well as daily news. In addition with the acquisition of more grammatical instruction and vocabulary, students will do individual and group projects, read works of prose and poetry, and follow current events in the Hispanic world. This course will use informative and thought-provoking films to focus on the contemporary history, art, and culture of Spain and Latin America. Supplementary literature, texts, articles, video clips, music, and presentations will provide background to historical events. Students will participate in debates and activities that promote effective oral and written communication.

Spanish 6 AP (full year) [Not offered in 2022-23.]

Niels Christensen

The AP Spanish Language and Culture course provides students with opportunities to develop language proficiency across the three modes of communication: interpretive, interpersonal, and presentational. Students learn about culture through the use of authentic materials that are representative of the Spanish-speaking world. Materials include a variety of different media, e.g., journalistic and literary works, podcasts, interviews, movies, charts, and graphs. AP Spanish Language and Culture is a language-acquisition course designed to provide students with the necessary skills and intercultural understanding to enable them to communicate successfully in an

environment where Spanish is spoken. As such, it is an immersion experience requiring exclusive use of Spanish, a requirement which class participation grades reflect.

French

French 1 (full year)

Anne Buld

In this course, students will get an introduction to the basic elements of the French language. These basic elements aim at developing communicative competence in French, which is divided into three strands: Interpersonal speaking and writing, interpretive listening and reading as well as presentational speaking and writing. To develop students' communicative competence, emphasis is placed on use of French in the classroom as much as possible and on use of authentic materials to learn about the French language and culture. Grammar is integrated into instruction according to the vocabulary and structures needed in the various situations in which the students are required to communicate.

Our curriculum will include: learning basic greetings, the family and home, food, school and activities, celebrations and how to make travel accommodations. Students will be required to present in French a quarterly project to the class. The project choice will align with what is being studied in class. Students will be given guidelines and coached as needed along the way. The projects will be graded as a test.

French 2 (full year)

Anne Buld

In French 2, students will enhance their comprehension of spoken and written French as well as their cultural awareness. The specific content to be covered is a continuation of written and oral skills acquired in French 1. Students will progress through the development of skills across the interpersonal, interpretive, and presentational modes of communication. Reading and writing receive more emphasis, while oral communication remains the primary objective. Focus continues to be placed on use of French in the classroom as exclusively as possible. In particular, students will develop their ability to address a French-speaking audience. They will further develop their language proficiency through the use of authentic materials to learn about the French language and francophone culture(s).

The students will be required to present a quarterly project in French to the class. The project choice will align with what is being studied in class. The students will be given guidelines and will take ownership of their chosen project and the research it entails. The projects will be graded as a test.

French 3 (full year)

Anne Buld

In French 3, students continue to develop their communicative and cultural competence by

interacting orally and in writing with other speakers of French, understanding oral and written messages in the language, and making oral and written presentations in French. This will be done through a variety of media and based on new topics in familiar contexts. They will be able to identify and understand main ideas and pertinent details when reading or listening to materials such as live and recorded conversations, short lectures, podcasts, videos, reports, and literary selections. Emphasis continues to be placed on use of French in the classroom, as well as authentic materials to dive deeper down in the learning of the French language and francophone culture(s). Students will be required to choose a quarterly project, which they will present in French to the class. The choice of their project will align with what is being studied in class. They will be given guidelines and will take complete ownership of their projects and the research that it entails. The projects will be graded as a test.

French 4 (full year)

Anne Buld

In French 4, students continue to develop their communicative and cultural competence in the interpersonal, interpretive, and presentational modes of communication as well as being able to speak and understand French with near-fluency and with a broad range of conversational skills. They will be able to exchange and support opinions, on a variety of topics related to contemporary and historical events and global issues at a proficiency level commensurate with their study. Students will comprehend and produce information drawn from a variety of authentic sources including but not limited to: listening to or reading materials live or recorded, short lectures, podcast, videos, music, films, reports and literary selections which will not only continue to explore and focus on topics related to France but also the French speaking world: “La Francophonie”. Students will be able to use a wide range of vocabulary, structures, and major time frames. Also, they will learn to identify various literary elements, such as plot, theme, setting, and characters in both spoken and written texts. Periodically, students will be asked to showcase what they have learned through class presentations promoting debate. Class is exclusively conducted in French and is discussion-based

French 5 (full year) [Not offered in 2022-23.]

Anne Buld

This course is designed around three themes which will be addressed via lessons on sub-themes topics. The three themes are as follows: 1/ Families and communities, 2/ Science and Technology, 3/ Beauty and Aesthetics. Activities will include journaling, oral and written presentations, emails, interactive exercises such as interviews with one another, using new vocabulary, listening activities, watching movies, listening to podcasts, and engage in meaningful discussions throughout the year, with the goal of being able to sustain informed, nuanced conversations in French about topics such as politics, social issues, and the fine arts.

French 6 AP (full year) [Not offered in 2022-23.]

Anne Buld

The AP French Language and Culture course is a college course which is designed to develop

students' awareness and appreciation of products, perspectives and practices of francophone cultures. This course is conducted entirely in French. The three themes that will be addressed via lessons and sub-themes are 1/ Contemporary Life, 2/ Global Challenges, 3/ Personal and Public Identities. In this course communicative strategies which are intended to facilitate communication with native speakers will be presented and practiced using only authentic materials and resources from francophone websites and publications from a variety of sources which include but are not limited to newspapers, websites and publications from a variety of sources which include but are not limited to newspapers, websites, literary work and songs. Complete fluency is the goal of this course and at the end of the course students will be able to:

- Speak French with accuracy and fluency using appropriate pronunciation and intonation.
- Read and understand a variety of authentic francophone texts including: newspapers, magazines and literary texts.
- Express ideas accurately and fluently without the use of a dictionary.
- Develop a wide-ranging French vocabulary and master of grammatical structures.
- Demonstrate awareness of some of the cultural perspectives, practices, and products of francophone people and countries.

All students will have multiple opportunities to practice and prepare for all aspects of the AP French Language and Culture Exam.

Additional Middle School Courses

Game Theory and Probability (fall semester)

Kevin Oliveau

Using board games as a learning tool, we will explore probability, expected value, decision trees, Bayesian reasoning, and game theory.

Reasoning about Complex Everyday Questions and Decisions (fall semester)

Deep Sran

This will be a seminar course in which students research and reason about complex everyday questions, which will require them to think deliberately about their own reasoning and what the pressures and influences on their reasoning might be. Students will begin by describing how they think about the complex questions and decisions they encounter in their daily lives or in the news. We will examine as a group how to find reliable and current information about these questions and decisions. Finally, we will examine and propose ways in which students can improve their everyday reasoning about complex questions and decisions. Students will determine which questions serve as the bases for this three-step inquiry. This course is designed around conversation and collaboration, so students work together to understand how they think individually and collectively.

Computer Science (spring semester)

David Romero

This middle school computer science course provides an introduction for students new to

programming. Students will learn new concepts and apply them to projects. We encourage those students with prior programming experience to go further by providing mentoring and frequent feedback to peers.

Exploring Music (fall and spring semesters)

Joe Omspach

The course will cover a broad range of topics, including electronic music, history, world music, and basic music theory. The goal of this course is to investigate all the various facets of music around the world and start a discussion about what music is and what it can be. For the final project students will learn the basics of setting up a Digital Audio Workstation (DAW), so that they can create their own piece of music using a computer. No prior musical experience is required.

Creative Explorations in Visual Arts (fall and spring semesters)

Eric Scott

In this exploratory course, students are provided the opportunity to develop creative curiosity as they engage in a wide range of artmaking experiences. Students will be introduced to a variety of visual arts materials (both 2-D and 3-D), methods, and design concepts, but the focus will be on using these ideas in personal investigations and experimentations in order to challenge themselves to think critically and creatively while improving skills and developing meaning in their making.

Physical Education (full year)

Dan Merold

The physical education program fosters integrity, respect, responsibility, and participation by focusing on cooperation, effort, development, and fun over winning and losing. A primary goal is for students to enjoy being active in order to create lifelong habits of physical activity. Students learn to take risks, try something new, and develop their physical fitness in a safe and positive environment. Classes increase their self-confidence while providing them with experiences in teamwork, sportsmanship, collaboration, critical thinking, and resourcefulness.

Additional High School Courses

AP Computer Science Principles (full year) [Offered based on interest.]

David Romero

This course is the product of the College Board's endeavor to introduce all students to computer science. It covers a diverse set of skills and topics, allowing students to explore what interests them. Second semester is largely spent on projects of increasing length. The final project is completely independent and will make up 40% of the overall AP score. The other 60% is determined by a traditional exam. This course is adapted from Computational Media, a course on creating animations, visualizations, and art with code. Since the results of our code are visual, programming is more concrete and the feedback more responsive. Skills and tools students learn are used by

professional artists, designers, and researchers.

Topics in Computer Science (fall semester)

Kevin Oliveau

We will be learning how processors work at the assembly code level. This will allow us to understand how hacking vulnerabilities are introduced. We will also learn some basic algorithm design optimizations and how Blockchain systems work.

Students taking this course should know how to code and/or have instructor permission.

Financial Planning and Literacy (fall semester)

Deep Sran

This will be a seminar course in which students think about their current professional and economic goals and explore their early ideas about the life they want to build, with a focus on financial planning. In the first part of the course, students will set forth and research what the life they want to build may cost, which will involve setting a detailed budget, understanding cost of living, and evaluating the economic potential of various career paths. The second part of the course will focus on financial literacy, so students understand the economic terms and concepts in the news and how those may influence their planning and change over time.

Math for Engineers (one semester) [Not offered in 2022-23.]

Instructor: TBD

Many young graduates come out of school with a solid knowledge of mathematical concepts, but then they struggle to apply these concepts in practice. This course is meant to fill this gap. Students will master the tricks of the trade that are rarely taught in school, such as scaling, symmetry, and the use of successive approximations. They will learn how to look at engineering or mathematical problems from different angles, validate their solutions, and flag possible errors. The material does not focus on formulaic manipulations of equations; it instead emphasizes analysis and explores connections between the equations and the application. These last skills are becoming ever more important as many traditional mathematical tasks are now solved by powerful computer software. The course is based on Sasha Draganov's book *Mathematical Tools for Real-World Applications* that is being published this summer by the MIT Press.

Prerequisites: precalculus and trigonometry.

The Films of Christopher Nolan (fall semester)

Dan Clinton

Over the past decade, popular filmmaking has been dominated by long-running franchises such as Fast and Furious, Harry Potter, Star Wars, and especially Marvel. Christopher Nolan may be the last filmmaker who is consistently doing original work with blockbuster budgets and creating the kind of cultural touchstones we used to associate with Steven Spielberg, Robert Zemeckis, or Francis Ford

Coppola. Along with Quentin Tarantino, he is also one of the few popular filmmakers who consistently experiments with narrative structure. Nolan's detractors describe his work as chilly and self-serious, but he remains a unique figure, whose popularity may tell us a great deal about the current state of film culture and popular culture writ large. Students will track the evolution of the filmmaker's style and thematic interests. Readings will include Tom Shone's book *The Nolan Variations*, alongside stories and artworks that have influenced Nolan's films, including works by Jorge Luis Borges, Francis Bacon, Raymond Chandler, M.C. Escher, and others.

Public Policy Seminar (fall semester/full year)

Deep Sran

This will be a project-based examination of the problem of school shootings. Students will work in groups to research what is known about the problem, including statistics, trends, current policies, and policy positions. They will explore what can be done about the issue, including current and proposed policy interventions. Then, they will decide what should be done to reduce the likelihood of these incidents in northern Virginia, which will require an understanding of current county and state policies, decision makers, and advocates, and outreach to key decision makers and stakeholders to make a policy recommendation, or to take action, that may shape decisionmakers' thinking on the issue. The course is designed to give students an opportunity to examine a complex policy problem and to inform policymaking at the local level. This course will begin as a semester course and may be extended to the full year based on student interest and progress.

2-D Studio (fall semester)

Eric Scott

In this open studio course students creatively engage with two-dimensional artmaking materials (drawing, painting, collage, mixed media, and more) and learn to creatively solve problems that arise on their papers, canvases, and boards. Materials, techniques, and design concepts will be introduced and discussed, but students work independently to decide how to best implement the ideas into unique and original works, thus enabling them to dive deeply into areas of interest and to explore new avenues that intrigue them.

3-D Studio (spring semester)

Eric Scott

In this open studio course students creatively engage with three-dimensional artmaking materials (paper, cardboard, wire, clay, and more) and learn to creatively solve problems that arise as they work to make art that stand up, pop out, and simply isn't flat. Materials, techniques, and design concepts will be introduced and discussed, but students work independently to decide how to best implement the ideas into unique and original works, thus enabling them to dive deeply into areas of interest and to explore new avenues that intrigue them.

Music Theory (fall semester)

Joe Omspach

Students will further their knowledge of how music is structured. This course will be designed to help build better ears through various aural training exercises as well as how to notate, read, and analyze music. No prior musical knowledge is required to take this course but a basic understanding of musical notation is highly encouraged.

Clubs, Extracurriculars, and Organizations

We have active chapters of both the National Junior Honor Society and National Honor Society. Clubs vary year-to-year as determined by student interest in the fall: recent favorites have included Model United Nations, Odyssey of the Mind, theater club, art club, film club, debate club, and Dungeons & Dragons. We also offer private piano lessons and guitar lessons on site during school hours.