Upper School Course Catalog

2023-24

Preparing Boys *for Life*.

INTRODUCTION

The Haverford School is committed to preparing boys for life. Our college-preparatory educational program comprises academic, athletic, and community aspects that offers students both a broad exposure and grounding in several disciplines and the opportunity to pursue and develop more in-depth interests ... and an emphasis on the development of character and citizenship. **

While most of our courses are heterogeneously grouped, certain advanced courses (marked with an asterisk *) are homogeneously grouped. Within this framework, students are encouraged to pursue a course of study that challenges them beyond the minimum graduation requirements, while allowing time for participation in extracurricular activities and programs as well.

Choosing the course of study that is ***best for you*** requires thought and care. Students should consult parents, advisors, department chairs and administrators when choosing their courses.

The goal is to develop a course of study that:

- develops one's talents and aptitudes through a varied curriculum
- underscores talents and strengthens areas of relative weakness
- allows time for activities, sports and other extra-curricular activities
- challenges you to discover, develop, and expand areas of the liberal arts that can become sources of pride, joy and fulfillment and
- meets all graduation requirements.

Please note:

A student entering the Upper School is placed in the appropriate level of math and language based on previous courses, testing, and consultation with the department chair.

Students and families, especially those new to the Upper School, will work with the faculty, advisors, and the Head of Upper School in the course selection process. Please call the Head of Upper School if you have any questions.

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GRADUATION REQUIREMENTS

In the Upper School, a student must complete:

English: 4 years

History: 3 years

Modern and Classical Languages: 2 consecutive years of the same language

Mathematics: 3 years in the proper sequence and through *Pre-Calculus*, *Pre-Calculus**, *Functions, Statistics, and Trigonometry*.

Laboratory Science: 3 years

Fine Arts: 2 full credits (see Fine Arts Section for more details)

Athletics or equivalent:

2 sports in Form III, IV, V

1 sport in Form VI

Health and Physical Education: 1 year in Form IV

Satisfactory Completion of the **Sixth Form Project**

Course Offerings and Registration Guidelines

Single section, non-required electives: These courses are typically offered if a minimum of eight students request the course and if an instructor is available.

Honors Courses: Advanced courses designated with an asterisk (*) are considered Haverford's most demanding courses and are designed to provide highly passionate students with rigorous academic experiences that move at an accelerated pace. Because we want every student to be successful, we are thorough and thoughtful in placing students in our most demanding honors courses. Entry into an honors course may vary by department and therefore students should refer to the prerequisite of each respective honors course to ensure they have met the requirements needed to successfully enroll in the course. Some departments require readiness diagnostics and other departments may require a specific grade and/or recommendation from the teacher and Department Chair in order to enroll.

Mathematics: The Mathematics Department approves placement of students in standard or advanced (*) sections. Students with special requests and situations (i.e. advanced work in summer school, enrichment courses, etc.) need to discuss their plans with the Department Chair and current teachers before such courses are taken. Advanced students must complete three years of math in proper sequence, even if they have taken the Pre-Calculus course before their third year of math in the Upper School.

Add/Drop: The Add/Drop period occurs during the first two weeks of Semester 1 and during the first week of Semester 2. Written approvals via email from a parent/guardian, the Department Chair(s), the respective teachers, and College Counselor (Form VI Only) must be provided for an add or drop of a course during the Add/Drop weeks. Courses cannot be dropped after the mid-point of the first Semester unless there are extenuating circumstances and only in consultation with the Head of Upper School, the appropriate Department Chair, and advisor.

Level Changes (Honors/Standard Add/Drops) Level changes between an honors level course and its standard counterpart after the class has commenced will be reviewed on an individual basis. A change in a level may result in adjusting other parts of the student's schedule in order to accommodate the level change and should be completed as early in the add/drop process as possible. After a quarter of the semester is complete, level changes will result in grades carrying over between courses. Changes to a student's level will not be processed after the midpoint of the semester.

Non-Haverford Courses: Credit is not granted toward the graduation requirements for courses taken at a school other than Haverford, though coursework completed in Modern and Classical Languages and Mathematics in Middle School may allow a student to take more advanced courses in those subjects in Third Form.

FORM III

Typical course offerings during the Form III year

ENGLISH	THE FINE & PERFORMING ARTS	HISTORY	LANGUAGE	MATH	SCIENCE
English I	Fundamentals of Music Theater I Visual Arts Foundations	Ancient World History	Chinese I Chinese II Latin I Latin II Latin II* Spanish I Spanish I* Spanish II*	Algebra I Geometry Geometry* Algebra II Algebra II*	Physics I: Concept -Based Approach Physics I: Problem - Based Approach

FORM IV

Typical course offerings during the Form IV year. Electives are *italicized*.

ENGLISH	THE FINE & PERFORMING ARTS	HISTORY	LANGUAGE	MATH	SCIENCE
English II: World Literature	***Electives***: *2D Art* *3D Art & Design* *Ceramic Arts* *Digital Art & Design* *Woodworking* *Music Composition & Production* *Music Theory & History** *Theater II* *(and all Form III electives)*	Modern World History	Chinese II Chinese III Chinese III* Latin II Latin II* Latin III Latin III* Spanish II Spanish II* Spanish III Spanish III*	Geometry Geometry* Algebra II Algebra II* PreCalculus PreCalculus* ***Electives:*** *Introduction to Computer Science*	Chemistry I Chemistry I*

FORM V

Typical course offerings during the Form V year. Electives are *italicized.*

ENGLISH	THE FINE & PERFORMING ARTS	HISTORY	LANGUAGE	MATH	SCIENCE
English III: American Literature	***Electives:*** *2D Art II** *3D Art II** *Ceramic Arts II** *Digital Arts II** *Woodworking II** *Theater III: Acting** *Theater III: Directing** *(and all Form III & IV electives*	United States History United States History* ***Electives:*** *African American Studies* *Contempory International Relations* *Global Financial Markets & Investments* *Government & Politics* *History of Global Health* *History & Sociology of Sport* *Social Psychology* *Global Perspectives with Travel to Guatemala (Interdisciplinary Studies Department)*	***Electives***: *Chinese III* *Chinese III** *Chinese IV* *Chinese IV** *Latin III* *Latin III** *Latin IV* *Latin IV** *Spanish III* *Spanish III** *Spanish IV* *Spanish IV**	Algebra II PreCalculus PreCalculus* ***Electives:*** *Calculus* *Calculus** *Calculus with Engineering** *Advanced Computer Science** *Econ. Micro** *Econ. Macro** *Finance: Financial Literacy* *Intro. to Computuer Science* *Logic* *Math Modeling to Solve Social Challenges* *Statistics* *Statistics**	Biology I Biology I* ***Electives***: *Chem II: Advanced Topics* *Engineering I: Engineering Applications* *Engineering I: Aided Design and Modeling* *Physics II:* • *Applied Laboratory Physics* • *Astronomy* • *Theoretical Physics** • *Electronics** *Policy and Ethics of Environmental Challenges*

FORM VI

Typical course offerings during the Form VI year. Electives are *italicized.*

ENGLISH	THE FINE & PERFORMING ARTS	HISTORY	LANGUAGE	MATH	SCIENCE
English IV English IV* English IV Seminar	***Electives:*** *2D Art Portfolio** *3D Art Portfolio** *Music Composition Senior Thesis* *(and all Form III, IV, V electives)*	***Electives:*** *African American Studies* *Comtemporary International Relations* *Eurpean Dictators** *Global Finacial Markets & Invest.* *Government & Politics* *History of Global Health* *History of Science, Sex, and Culture** *History and Sociaology of Sport* *Social Psychology* *Global Perspectives with Travel to Guatemala (Interdisciplinary Studies Department)*	***Electives:*** *Chinese IV* *Chinese IV** *Latin IV* *Latin IV** *Latin V Prose** *Latin V Poetry** *Spanish IV* *Spanish IV** *Spanish V Cine* *Spanish V Conv.* *Spanish V Latin** *Spanish V Literat**	PreCalculus PreCalculus* ***Electives:*** *Calculus* *Calculus** *Calculus with Engineering** *Advanced Computer Science** *Intro. to Computuer Science* *Econ. Micro** *Econ. Macro** *Finance: Financial Literacy* *Logic* *Math Modeling to Solve Social Challenges* *Statistics* *Statistics**	***Electives***: *Biology II:* • *Anatomy & Physiology* • *Cellular Physiology** • *Infectious Disease* • *Molecular Biology** *Chem II: Advanced Topics* *Engineering I: Engineering Applications* *Engineering I: Aided Design & Modeling* *Environmental Science* *Physics II:* • *Applied Laboratory Physics* • *Astronomy* • *Theoretical Physics** • *Electronics** *Policy & Ethics of Environmental Challenges*

ENGLISH

Philosophy and Overview

The English Department is dedicated to educating boys to see the world around them clearly, critically, and sensitively. Through the study of literature, we strive to nurture young men to be thoughtful and generous forces in their communities and to be able to read, write, and speak with precision and power. As students examine literature, they encounter attitudes and lives that expose them to new perspectives. As they write personal narratives, creative pieces, and analytic papers, they build and explore their rhetorical and artistic skills. As they speak in small discussion groups and in formal presentations, they discover their own voices and learn to listen to each other.

The English program sharpens each student's critical awareness—in reading skills, in writing, and in oration. As students learn to recognize linguistic structures and possibilities, they also come to understand the basic elements intrinsic to literature of many genres. We know that close observation of textual detail enriches the rhetorical quality of thinking, writing, and speaking. We know that writing is a concentrated form of thinking, so we place special emphasis on the writing process. In our efforts to shape and sharpen our students' verbal skills, to expand their knowledge of literature, and to add to their general intellectual growth, we provide memorable and useful experiences. Such is our ambition: that our efforts and associations will instill habits and skills of lifelong value.

English I **(1 cr.)**

This course seeks to ground students in the essential elements of effective reading, writing, and speaking. Two major objectives are to teach students to read for meaning and to express themselves clearly and logically through the written word. Writing assignments vary from analytic and personal essays to journal entries and creative exercises. Most assignments emphasize revision and require multiple drafts. Students read and discuss works from many genres and examine how plot, character, theme, and language inform each other. Lorraine Hansberry's *A Raisin in the Sun*, Joe Kelly and Ken Niimura's *I Kill Giants*, William Shakespeare's *Macbeth,* Julie Otsuka's *When the Emperor was Divine,* William Golding's *Lord of the Flies*, and short story and poetry selections enhance our students' understanding of the power of language and the richness of human experience. English I also includes a formal study of grammar and usage, based on traditional text and online resources, and vocabulary, largely from *Wordly Wise 3000*.

English II: World Literature **(1 cr.)**

This course exposes students to many genres of world literature and reinforces boys' understanding of critical terminology. It places special emphasis on close reading and urges students to explore how figurative language, allusion, connotation, and imagery

enhance meaning. Students hone these skills through reading Khaled Hosseini's novel *The Kite Runner,* Athol Fugard's play *"Master Harold"… and the boys,* and short stories from Gabriel García Márquez, Ha Jin, and Jhumpa Lahiri's *Interpreter of Maladies*. Marjane Satrapi's graphic novel *Persepolis* and Chinua Achebe's novel *Things Fall Apart* complete a selection that we hope will challenge and broaden the perspectives of our young men. Expository essays help students develop analytic and critical skills; personal narrative assignments encourage Fourth Form writers to develop their own voice or rhetorical style. Original poetry, short stories, and frequent print or digital journal entries complement more traditional writing assessments. In order to further their ability to communicate effectively and gracefully, students also continue the study of grammar and vocabulary begun in Third Form, turning their attention to usage and the mechanics of writing. In addition to our online subscription to the grammar and usage resource IXL, students continue to use *Wordly Wise 3000* for vocabulary study.

English III: American Literature **(1 cr.)**

Building upon the grammatical foundation and introduction to literary genres established in Fourth Form, this course offers a selective thematic survey of varieties of the American experience. The course includes selections of poetry, fiction, and essays from authors such as Phillis Wheatley, Frederick Douglass, Walt Whitman, Emily Dickinson, Langston Hughes, and Nella Larsen. Core texts include Tommy Orange's *There There,* Junot Díaz's *The Brief Wondrous Life of Oscar Wao,* Zora Neale Hurston's *Their Eyes Were Watching God*, F. Scott Fitzgerald's *The Great Gatsby,* and August Wilson's *Fences*. Our study of American literary culture serves as the basis for regularly assigned critical papers and personal narratives. Teachers assign a variety of topics, and as the year progresses, students are given greater freedom to choose their topics and their approaches. The department expects papers to be thorough, well organized, clearly worded, insightful, well documented, and substantially free of spelling, grammatical, and mechanical errors.

English IV: The Individual and Society (*fall*) **(.5 cr.)**

The fall term is devoted to honing skills in close reading and careful writing. Students write daily reflections and commentaries, and, in frequent personal narratives and analytic essays, demonstrate their command of rhetorical devices, their emerging mastery of different writing styles, and their growing skill at editing. Resources like William Zinsser's *On Writing Well* provide accessible and engaging guides for aspiring writers to refine their diction, syntax, and style. Classic and contemporary poetry, creative nonfiction essays, Eleanor Burgess' *The Niceties,* Ta-Nehisi Coates' *Between the World and Me,* and William Shakespeare's *Hamlet* allow students to think deeply about how individuals express their relationships with surrounding social structures.

English IV* (*fall*) **(.5 cr.)**

Prerequisite: A- average in English III, the recommendation of their English III teacher, and, after consideration of a writing sample, the consent of the department.

This seminar aims to challenge our most motivated students to become better writers and more attentive readers of literature and the world around them. Readings from a variety of genres, including speculative fiction and historical fiction, fuel close-reading exercises and discussions of modes of realism and topics in philosophy. We also read nonfiction and personal narratives, paying careful attention to these writers' use of language. By imitating these writers in their own personal narratives and analytic essays, students learn to write clearly and creatively, and they gain a greater appreciation for writing as a craft. In the second half of the semester, we use our improved critical reading and writing skills to dive deeply into a study of *Hamlet*, where students develop an awareness of scholarly criticism and learn to engage with secondary sources.

English IV: Spring Seminars

In the spring, English IV becomes a seminar style topic-centered class based on the college model, in which students assume more responsibility for class discussion and presentation. The department gives students the opportunity to indicate preference of seminars, but sections are formed in the fall at the discretion of the department and depend upon staffing and class-size limits. Recent offerings include:

Art of the Short Story **(.5 cr.)**

Students immerse themselves in a variety of short stories, concentrating on what makes the short fiction genre special. They also craft original pieces of fiction and discuss them in the workshop format. From work by Alice Walker and Truman Capote, to Vladimir Nabokov and Jamel Brinkley, we read a broad selection of fiction offering a range of narrative voices, including contemporary stories.

Journalism: Speaking Truth to Power **(.5 cr.)**

Students will develop their writing abilities through a study of a variety of contemporary journalistic lenses: news, features, arts criticism, opinion, sports, and world-affairs news analysis. We will read, write, critique, revise, and publish. We will consider the state of contemporary American journalism in its print, digital, video, and social media contexts.

The Language of Film **(.5 cr.)**

What is the American experience? In this course, students will explore a selective survey of contemporary U.S. American cinema. While all of the films take place in the United States, they represent a wide range of experiences and regions–from rural to urban, from

the "heartland" to coastal cities. Students will consider these films as narratives, or stories; we will examine whose stories are told and how these diverse experiences and voices are represented in film.

Matters of Life and Death: Literature of Migration (.5 cr.)

What makes a place home, and why do people leave one home in search of another? What do people hope for and expect as they resettle themselves in a new country, and what do they actually encounter? In a nation that once styled itself "a nation of immigrants," the topic has become controversial and highly politicized; today's immigrants and asylum seekers face uncertainty and sometimes hostility. Writers and narrators who migrate challenge our understanding of home and the ways in which movement impacts how we think of culture and identity.

Page & Stage (.5 cr.)

After close readings of contemporary and classic plays, students view video performances and attend live performances on Philadelphia stages. We then evaluate the effectiveness of the productions using the critical language of the arts journalist. Whenever possible, we discuss the creative process with writers, directors, designers, and actors.

Post 9/11 Literature (.5 cr.)

What is it like to be Muslim and living in a post 9/11 world? How has literature addressed the complex questions related to identity, religion, belonging, and terrorism? Through our study of two modern novels, *The Reluctant Fundamentalist* by Mohsin Hamid and *Home Fire* by Kamila Shamsie, we will explore these topics and more.

FINE & PERFORMING ARTS

GRADUATION REQUIREMENTS

The Fine Arts requirement in the Upper School can be met through **two** of the following:

- satisfactory completion of a year-long Visual Art, Music or Theater course equals one full credit.
- satisfactory completion of two semester length Visual Art courses equals one full credit.
- satisfactory participation in Choir, String Orchestra, Chamber Music or Jazz Ensemble for one year equals one full credit.
- satisfactory participation in three trimesters (sports seasons) in Stage Crew or being an actor in two school dramatic productions equals one full Performing Arts Department Credit.

Fine Arts activities that are being used as a sports credit (stage crew or performance ensembles) may **NOT** simultaneously count for a Fine Arts Credit. Students must announce their intention that their participation will be for credit at the beginning of each activity. Students may combine courses and activities to accrue a total of two-year's credit to complete their Fine Arts graduation requirement.

VISUAL ART

Philosophy and Overview

The Haverford Art Department believes that an understanding of and practice in the visual arts is an essential part of a strong liberal arts curriculum. As well as providing learning experiences that lead to further study and careers in creative professions, the art curriculum emphasizes the ways in which working in the art studio teaches broader essential life skills. Artists often work from observation in order to strengthen their ability to see more powerfully and critically. We understand that artists use this powerful visual language of signs, symbols, colors, and forms to investigate and communicate ideas. Through their studies, students become aware of how this language is at work in the world around them and become skilled in their ability to communicate effectively. Works of art often involve subtle meanings and complex systems of expression that go beyond ordinary speaking and writing. The actual practice of making art engages the imagination, fosters flexible ways of thinking, develops disciplined effort, promotes innovation and builds self-confidence. Creative people of all sorts, artists, writers, designers, scientists and engineers are all well versed in the complex and challenging process of bringing new ideas into being.

Through the Visual Arts curriculum at Haverford, students are able to gain a facility with this creative practice, making it transferable across disciplines. For some students the study of art will lead to careers in the arts. For many others, it will develop a valuable facility with the often frustrating creative process of bringing something new into being, whether they do so in the art world, the business world, scientific careers or wherever they find themselves. Others, too will have permanently enhanced the quality of their lives with a fluency in the visual language and an informed appreciation of the arts.

Each course offered provides students with a broad survey of contemporary and traditional art concepts, techniques and working methods. 2-Dimensional courses emphasize the study of art concepts through the use of drawing, painting and printmaking media. 3-Dimensional courses emphasize traditional sculptural media such as ceramics and woodworking as well as the most contemporary techniques such as 3D printing, laser engraving and product design. 2D Design, Photography and Video & Animation students work with some of the most contemporary digital media available to artists creating photographs, videos, animations and graphic design works. Woodworking Arts addresses these same overarching skills through traditional and contemporary work in this medium. Sequential courses build on the knowledge and skills developed in earlier courses but are flexible enough to allow students to move between 2- dimensional, 3-dimensional or Digital media courses. We strive to instill the courage to face challenges, the skills and practices involved in solving complex problems, a fluency in the primal visual language and an understanding and appreciation of the visual arts and the work of artists throughout time and across cultures.

Visual Art: Foundations **(1 cr.)**

This yearlong course introduces students to the fundamental vocabulary of the visual artist across a wide variety of media, and working methods. Students are exposed to those skills, knowledge, and practices fundamental to the visual arts, providing the starting point for all further visual arts courses at Haverford. Students have the opportunity to work with art instructors in three of our art studios. Drawing, Painting, Sculpture, Ceramics, 3D & 2D Design, CAD, 3D printing, and Graphic Design are explored through a variety of hands-on projects. Each project develops students' visual acuity, their fluency in the visual language, and their practice in the creative process. Much emphasis is placed on drawing, painting, sculpting from observation, using the figure, and objects and environments of the students' real world and experiences. By means of structured projects, each student is encouraged to seek imaginative, personal solutions to a wide variety of problems while learning traditional visual art skills and techniques. Creative concepts, strong design, and effective use of media are stressed in an effort to help the student challenge himself and tap his deepest creative potential. Historical and contemporary artists and movements are introduced in relation to each new unit of study. Group critiques, student websites, and written "reflections" give each student the opportunity to learn to articulate his observations about his own work and that of his classmates.

Two-Dimensional Art I **(.5 cr.)**

Prerequisite: Successful completion of Visual Art Foundations.

These semester-long courses serve as the second level in the two-dimensional (drawing and painting) art sequence, building on the skills and concepts introduced in the Foundations course. Working in a variety of media with pencil, charcoal, pastel, printmaking techniques, watercolors, and acrylic paints, students will explore the fundamentals of line, shape, form, value, color, texture, and composition. Students will begin the course working in black and white and later explore basic color theory. Projects will stress important academic art skills as well as explore prevalent themes in contemporary art, students will strive to develop personal concepts that are well thought out and developed in concept, design, and use of media. Many projects offer significant freedom for students to explore their own ideas and develop their creative thinking skills. Students will use their personal art websites to document and describe their process and product. Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another art semester course.

Two-Dimensional Art II* **(.5 cr.)**

Prerequisites: Visual Arts Foundations and two additional semesters of arts courses (2D Art I preferred). A- or better in previous art courses and teacher recommendation is necessary for consideration.
Open to Fifth and Sixth Form students

This semester-long course is the third level of the two-dimensional (drawing and painting-based) visual

arts sequence. Projects continue to build both technical skills and conceptual versatility. New media introduced this year include new printmaking techniques and oil painting. Projects offer the opportunity for more personal approaches to solutions to individualized project challenges. Each project will have a reference to contemporary or historical methods and concepts, giving students an understanding of how their work is part of our cultural tradition. Students will use their personal art websites to document and describe their process and product. As with honors courses in other disciplines, significant time outside class is required in the studio and/or working at home.

Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another art semester course.

Two-Dimensional Art Portfolio* **(1 cr.)**

Prerequisites: Successful completion of four semester long courses and departmental approval. A- or better in previous art courses and teacher recommendation is necessary for consideration.
Open to Sixth Form Students

Two-Dimensional Art Portfolio* is an intensive culminating thesis seminar for the most experienced visual art students. The course is designed to transform experienced art students into emerging young artists by stressing the development of a personal visual arts thesis and a supporting body of work. During class and two hours of extra studio time per week, students will create a related body of work in the form of an investigation. Through individual research and experimentation, each student will discover and refine his most eloquent voice for effective communication in the visual language. While individual artists will work in different media and dissimilar concepts, the class will meet as a group to learn about contemporary artists and critique each other's work. The year finishes with an exhibition of students' thesis works.

Ceramic Arts I **(.5 cr.)**

Prerequisite: Successful completion of Visual Arts Foundations.
Open to Fourth through Sixth Form Students

Ceramic Arts is one of three second-level courses in the progression of our 3-Dimensional art curriculum. This semester course is designed to provide a thorough immersion into contemporary and historical practices within the field of Ceramics. Ceramic Arts students will be encouraged to pursue a curiosity about the linkages between process, meaning, and perception within a challenging yet supportive studio environment.

Expanding on the ideas presented during the Foundation year experience, Ceramic Arts students will be introduced to and use a huge variety of tools and processes including but not limited to the potter's wheel, figurative sculpture, mold-making, slab-building, and alternative surface treatments. The ultimate aim of this class is to gain the tools and skills to become fearless in the pursuit of an individual artistic voice with skill-building, research, and experimentation happening simultaneously. The work in Ceramics, as in all visual art classes, aims to strengthen students' ability to think and see critically, to develop a fluency in the visual language, and to become more adept at the creative process. Students can take both the fall and spring

semester courses without repeating projects or can combine one semester with another semester art course.

Ceramic Arts II* **(.5 cr.)**

Prerequisites: Visual Arts Foundations and two additional semesters of arts courses (Ceramics I preferred). A- or better in previous art courses and teacher recommendation is necessary for consideration.

Students in this semester long course to build on the technical skills and processes from Ceramics I. Students will learn to mix glazes and the basics of firing kilns as well as advanced wheel throwing and handbuilding techniques. Complex functional forms such as Lidded Jars, Teapots and Nesting Bowls will be explored alongside figurative sculpture and modeling. Projects in Ceramics II* are designed to encourage the development of individual student voices reflecting their individual interests and pursuits. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home is required. Students can take both the fall and spring semester course without repeating projects or can combine one semester of this course with another arts semester course. **Ceramics Arts II* is a third level course open to students in the Fifth through Sixth Forms.**

Woodworking Arts I **(.5 cr.)**

Prerequisite: Successful completion of Visual Arts Foundations.

This course allows interested students the opportunity to explore the sculptural and functional aspects of design with wood. At the core of our work is developing an understanding for and a facility with the design process. This project-based course will build from simple construction methods with wood and wood tools and gradually expand the scope and skills used to create more complex forms, culminating in a project of the student's own design. Students will have the opportunity and expectation to work imaginatively while accomplishing the goals of each project. The use of hand and power tools as well as the qualities of selected woods will be a component of each unit. Students will learn the basics of linear perspective, orthographic perspective, and scale drawing techniques used by designers, architects and engineers. Students will maintain sketchbooks for planning purposes and a shared personal blog where they will document the progress of their work and learning. Ms. Sides will teach this course with some team teaching help from Mr. Thorburn (Assistand Head). Students can take either the fall or spring semester course and can combine that one semester with another semester-length are course. **Woodworking Arts I is a second level course open to students in the Fourth through Sixth Forms who have completed Visual Arts Foundations and have the approval of those teachers.**

Woodworking Arts II* **(.5 cr.)**

Prerequisite: Successful completion of Woodworking Arts I & the recommendation of the teaching faculty.

Woodworking II* continues the practice begun in Foundations and Woodworking I that develops both the technical skills and conceptual foundations craftsmen use to design and build functional and sculptural works with wood. New tools and techniques are introduced and basic skills are reviewed and strengthened through increasingly complex project challenges. At this level, instructors guide students' development in the creative practice through a sequence of projects based on individual student interests and experience. Students will continue to maintain sketchbooks for planning purposes that will document the progress of their work and learning. Starting with simple to use scroll saws, and working towards milling their own wood from rough sawn lumber, students will learn new tools and techniques as the continue through the levels. Three instructors will team teach this course who all have unique experience with fine woodworking and building. As an honors course, significant time outside of class is expected in the planning, research, and construction phases of these complex projects. Ms. Sides will teach teach with Mr. Thorburn. Although similar, each semester will vary enough for a student to take both semesters without repeating any material and to deal with increasingly complex ideas and techniques or students can combine one semester of this course with another arts semester course. **Woodworking Arts II* is a third level course open to students in the Fifth through Sixth Forms who have demonstrated the ability to work in a safe & focused manner in this studio**

3D Art & Design I **(.5 cr.)**

Prerequisite: Successful completion of Visual Arts Foundations.

These semester-long courses serve as one of five possible second-level courses in the Visual Arts sequence and build on the basic skills acquired in Visual Arts Foundations. 3D Art & Design I features a more in-depth focus on the design process in the production of both sculptural and functional objects. Each project will require research, sketching, idea development, execution, and reflection. A variety of 3D design projects ranging from simple woodworking projects, fine art sculpture, product, and architectural design will provide students with the multifaceted experience of planning, design, and construction of objects. Students will utilize an array of tools from a personal sketchbook to the industry-standard laser cutter. Although similar, the first semester focuses on seeing and creating objects using the basic modeling methods with wood, plaster, clay, foam, and wire while the second semester expands into exploring the laser cutter's ability to create complex prototypes at industry standards. Students can take both the fall and spring semester courses without repeating projects or can combine one semester with another semester-long art course. 3D Art & Design is a second level course open to students in the Fourth through Sixth Forms.

3D Art & Design II* **(.5 cr.)**

Prerequisites: Visual Arts Foundations and two additional semesters of arts courses (3D or Woodworking preferred). A- or better in previous art courses and teacher recommendation is necessary for consideration.

3D Art & Design II* is a third level design and sculpture course that builds on the skills and concepts of 3D sculpture and design begun in Foundations and 3D Art & Design I. Students will focus on technical skills and conceptual development needed to create functional and sculptural works. We will continue to manipulate various 3D materials and media including wood, clay, silicone, resin, plaster, cardboard, foam, and found objects. Extensive technical demonstrations will help students develop material interests and studio skills, including innovative uses of both manual and digital processes. Students will develop imaginative and creative solutions through a series of structured problem-solving challenges as well as project proposals for independent projects. Students will continue to develop their own voice as an artist and be challenged to work collaboratively on a project experiencing some aspects of the design world. As with honors courses in other disciplines, significant time outside of class spent in the studio and or working at home, where possible, is required. Students can take both the fall and spring semester courses without repeating projects or can combine one semester of this course with another arts semester course. 3D Art & Design II* is a third level course open to students in the Fifth through Sixth Forms.

3D Art Portfolio*: **(.5 cr.)**

Prerequisites: Successful completion of four semester long courses. 3D Art Portfolio is intended for the most dedicated and experienced Sixth Form students only. An A- or better in 3D Art & Design II*, Woodworking II*, or Ceramics II* is necessary for consideration.*

3D Art Portfolio* is our most advanced sculpture and three-dimensional design course, deepening the skills and processes generated in the 3D Art & Design II*, Ceramics II*, and Woodworking II* course (see above description). Students will be assigned conceptual prompts and projects in addition to individualized areas of research, and self-directed projects. Students will work closely with the instructor through one on one meetings and with their peers through in-progress and final critiques. This class is for the most serious Haverford students who are passionate about developing their voice as an artist and creating a portfolio of their work for future use, i.e. college fine art, architecture, design programs. Students will be pushed to challenge themselves through working within guidelines and how they can continue to make exquisite and thoughtful work that they will be proud of for years to come. Students are required and expected to come to 3D Portfolio with an existing explementary website that documents their work at Haverford to date. As with honors courses in other disciplines, significant time outside of class spent in the studio and/or working at home is required.

Digital Art & Design I **(.5 cr.)**

Prerequisite: Visual Arts Foundations

In this semester-long course, students will explore different artistic methods and software. Students will solve complex visual design problems and find their artistic voice. Students will learn about DSLR photography and photo editing, website design, graphic design, laser cutting, CAD & 3D printing, typography, video, and animation. An understanding of composition, color theory, and universal design will be cultivated as students engage in some projects that are centered around personal expression and others with a focus on design for commercial purposes. Students may sign up for fall and/or spring, as the two semesters will have different areas of focus. In the fall semester course, students will primarily explore photography, Adobe Photoshop, and video editing. The spring semester will focus more heavily on Adobe Illustrator, graphic design, typography, and laser cutting. Students in both semesters will hone their creativity, digital literacy skills, and confidence in using emerging technologies. Digital Arts & Technology can be taken a full year or combined with any other semester-long art course.

Digital Art & Design II* **(.5 cr.)**

Prerequisites: Successful completion of Digital Art & Design I (Digital Art & Design I preferred). A- or better in previous art courses and teacher recommendation is necessary for consideration.

Students in this semester-long honors digital art course will work across a range of digital media developing personal responses to project challenges related to prevalent themes in contemporary art. Students will deepen their skills with technology-based art mediums such as photography, graphic design, video, animation, CAD, 3D printing, and laser cutting as they explore ideas that are personally compelling and related to the contemporary world of art and design. Students will build on previous coursework as they develop their ability to use the visual language to communicate, persuade, inform, and connect. This honors course is designed for students who have developed the capacity to work in the art studio independently and are able to devote significant time to their projects outside of class. Students may take the course fall semester, spring semester, or full-year without repeating projects.

MUSIC

Philosophy and Overview

Satisfactory participation in Choir, String Orchestra, Jazz Band, **or Rock Band** for one year equals one full credit.

Participation in musical study and performance facilitates an appreciation for beauty, a means of self expression, intellectual growth and a forum for positive community activity. We believe that one appreciates most what he understands and that one understands best what he has experienced. The music curriculum is experiential and has as its core musical literacy and artistry. Literacy is not an end unto itself; rather it is an avenue to artistry, understanding and appreciation. The curriculum is structured to prepare our boys for a lifetime of participation in the musical arts as performers or appreciative, well-educated audience members. Students have the option to pursue an intellectual study of music through the study of theory, performance, production, songwriting and history. Students may also pursue performance-based participation in the school's musical ensembles. Performance based study includes options in both vocal and instrumental realms. Students may audition for any number of ensembles, including Men's Choirs, String Orchestra, **Jazz Ensemble or Rock Band**. Musical ensembles may be taken in fulfillment of the Upper School Arts Requirement. In addition, because of the physical and cooperative nature of ensemble work, yearlong participation in one of the school's musical ensembles may be used to fulfill one season of sports requirement. Two ensembles, Glee Club and Orchestra, are offered for academic credit.

Fundamentals of Music **(1 cr.)**

This is a yearlong introductory level course to understanding, reading, writing, and creating music. It is intended for students who want to pursue their passion for music but need help building a strong foundation of musical skills, concepts, and language. This course will function as a prerequisite for other higher-level music classes unless a firm grasp of the concepts and skills is demonstrated to the teacher. Students will be expected to begin their mastery of basic to intermediate rhythms in various time signatures, including rhythmic markings; note identification in multiple clefs in every key signature including ledger lines. Intervals, scales, triads, and seventh chords will be introduced both visually and aurally as well as popular song structures/forms, allowing for both analysis and composition of songs. In order to reinforce these concepts, students will be singing, using MIDI keyboards, percussion, and using digital compositional tools such as Garage Band, Logic Pro and Hookpad Theory.

Music Composition and Production **(1 cr.)**
Prerequisite: Fundamentals of Music or instructor approval.

This course is designed to help students compose and produce their own music. A brief study of some modern compositions will inform us, but the bulk of the course will be the art of writing and

producing your own songs. Students will learn how to compose using digital and traditional methods, but in the end will have significant authority in deciding what kind of music they are interested in writing. Students will learn the art of writing a good melody, the art of writing effective harmonies, understanding the texture, layering of multiple parts in music, analyzing the components of compositions from various genres, the technological aspect of using digital software to compose music including both music production software such as Garage Band, Logic and music notation software such as Finale and the art of lyric writing or being a librettist. They will also learn how to use MIDI and digital instruments to enhance their compositions and how to set up microphones to record voices and/or instruments, and how to produce a finished product.

Music Theory and History* **(1 cr.)**
Prerequisite: Fundamentals of Music or instructor approval.

This is a yearlong honors level course intended for the most musically proficient and inquisitive students. This is a two-pronged course in which we will cover collegiate level theoretical topics that are applicable to all styles of music. These skills will be reinforced through an intense study of music history. We will start in the medieval era and watch and listen to how music evolves throughout time up to the current hits that are listened to today. As we listen to Gregorian chant we will find a better understanding of melody. The polyphony of the Renaissance will inform our understanding of chord progressions, while the Baroque era will be better understood through counterpoint exercises. While our understanding and appreciation of music deepens through our study of classical music, it culminates in applying all of these concepts to modern music. We will analyze what it is that makes music affect us the way it does and learn how to manipulate sound the same way great musicians have throughout history.

Music Composition Senior Thesis **(1 cr.)**
Prerequisite: Fundamentals of Music, Music Theory & History, Music Composition, or instructor approval*

This is a yearlong course for students who have completed all courses above. Students will continue to hone their theory and composition skills. Using texts as guides, students will continue to use Finale and Hookpad Theory to create and perform their music. It is expected that students' compositions will be publicly performed during the course of the year.

Glee Club

Students learn the technical aspects of good singing, including breath control, formation of vowel shapes and vocal tone, proper diction in a variety of languages, range extension and agility. Students study repertoire from a variety of genres, from classical to folk to jazz and modern. They perform a capella music as well as music accompanied by piano and orchestra. Through their rehearsal and performances, students learn a valuable skill that can be used as a form of self-expression as well as a powerful form of communication. As the music is being rehearsed daily, various compositional techniques and elements of form are pointed out. Glee Club members participate in service learning through outreach performances. This chorus performs at four major concerts each year, at Haverford, in New York City, and in our community. The Glee Club joins forces with area girls' schools and with Haverford's boy choir to perform works such as Vivaldi's Gloria, Handel's Messiah, and Haydn, Mozart and Schubert Masses.

Orchestra

Orchestra is an auditioned ensemble. Students must demonstrate satisfactory ability on their principal instrument to participate, as determined by the director. Students learn to phrase artistically, and develop techniques of articulation, expanded dynamic range, and stylistic interpretation through performance of a range of repertoire covering multiple styles and genres. Orchestra members develop ensemble skills such as leading, critical listening, and collaboration. In addition, students refine technical skills on their given instruments. The Orchestra performs during the annual Haverford School performances.

THEATER

Philosophy & Overview

The purpose of acting, Hamlet tells us, is to hold 'the mirror up to nature.' Students of theater at The Haverford School strive to represent most aspects of human behavior in thoughtful, well-prepared performances both in the classroom and on the Centennial Hall stage. Students are encouraged to understand the world by thinking carefully of their own experience, by inhabiting the skins of others, and by studying classic and contemporary drama.

Theater students develop a speaking voice of power and expression. They learn to move with strength and grace. They experience the value of collaboration in large productions including actors, designers, and technicians. They learn to listen to their peers and to carefully critique their work. Most importantly, theatre students develop a physical and emotional confidence to complement their growing intellectual and athletic abilities.

Theater I **(1 cr.)**

Provides students with opportunities to increase self-awareness, develop critical thinking skills, and explore their talents on and off of the stage. The course begins with an overview of public speaking skills. Students put these skills into practice by performing original monologues and scenes from classic American theatrical works. In addition, students learn to incorporate their skills in literary analysis by translating their critical understanding into choices they make as an actor. Participation as audience members at Upper School productions provides excellent opportunities to connect class work to live theatrical plays performed by their peers. Students also learn the basics of design and technical theatre to enhance their understanding of the collaboration that is necessary to bring theatrical works to life. The introduction of stage combat provides an opportunity for the students to understand how their movements can tell the story as well. The course culminates in the production and performance of a a stage combat scene.

Theater II **(1 cr.)**

Prerequisite: Successful completion of Theater I or recommendation from the Chair of the Performing Arts.

Theater II is an intermediate level course which builds on the skills acquired in Theater I. Using scripts from 20thand 21st century plays, students read, discuss and act in works by modern playwrights who are bright examples of the power of drama. Scene study focuses on students taking greater risks in their acting work and performance exercises will also include roles that will stretch the student actor. Individual expression and creativity is also encouraged through dramaturgical projects within the context of each play being studied. Participation in or attendance at all Upper School productions will be mandatory as a way of studying and experiencing the various tools in action. Theatre II will also travel off campus to view

a professional production in order to become discriminating consumers of live theatre. The art of directing is an integral unit in Theater II. Each student will direct a scene from one of the plays read in class. They will concentrate on study of the world of the play, character motivation, implementation of blocking, production history, and most importantly, communicating the action of the scene to their peers. Students also begin sword play as they advance to the next level of stage combat. As a final project, students are required to perform a scene of their choice that incorporates the swordplay skills they have acquired.

Theater III Acting* **(.5 cr.)**

Prerequisite: Instructor recommendation, completion of Theater I and II, Participation in at least one Centennial Hall production prior to the first day of class is required.

Theater III* Acting is an advanced level Independent Study in theatre generally reserved for Fifth and Sixth Form that incorporates many of the lessons and techniques acquired in Theatre I and II. Students of the class form a production company with the goal of presenting a play for The Haverford School community and general viewing audience. Under instructor supervision and guidance, participants select a play, rehearse and perform the show. Each member of the course will also help build the set, procure costumes and props, and will be responsible for the marketing and publicity to promote the show. Professionals from the theatre community are invited to attend performances to give the students valuable feedback. Theatre III gives students an excellent, hands-on experience in establishing and being responsible for their own production company. A focus on playwriting is also optional.

Theater III Directing* **(.5 cr.)**

Prerequisite: Prerequisite: Instructor recommendation, completion of Theater I and II, Participation in at least one Centennial Hall production prior to the first day of class is required.

Theater III* Directing is an advanced level Independent Study in theatre generally reserved for Fifth and Sixth Form that incorporates many of the lessons and techniques acquired in Theatre I and II. Students of the class form a production company with the goal of presenting a play for The Haverford School community and general viewing audience. Under instructor supervision and guidance, participants select a play, rehearse and perform the show. In this section, members will be responsible for directing moments in the performance. Students will deepen their understanding of direction for the theater from Theater II through preparation and practice, all advised by the instructor. Each member of the course will also help build the set, procure costumes and props, and will be responsible for the marketing and publicity to promote the show. Professionals from the theatre community are invited to attend performances to give the students valuable feedback. Theatre III* Directing gives students an excellent, hands-on experience in establishing and being responsible for their own production company.

HEALTH & PHYSICAL EDUCATION

Philosophy and Overview

The primary goal of the Health and Physical Education curriculum is to provide the boys with the framework necessary to develop and maintain a healthy physical, mental, social and emotional outlook. Through the health portion of the curriculum the boys are introduced to the following concepts:

- Mental, Social and Emotional Health
- Reproductive Systems / Pregnancy
- STD'S, AIDS / HIV
- Cancer, Heart Disease and Diabetes
- Drug, Alcohol and Tobacco Abuse
- Stress Management
- Anatomy and Physiology
- Biomechanics
- CPR / First Aid / AED

Through the physical education curriculum, the boys are introduced to the following concepts:

- Bioenergetics and Exercise Metabolism
- Sport and Wellness Program development
- Advanced Nutrition Concepts
- Fundamentals of Biomechanics, Motor Skills
- Program Validity and Reliability
- VO2 Max, Cardiac Output
- Biomechanical Analysis
- Planning and Time Management

This course is required for all Fourth Form students. The class meets three times per cycle, and is divided into two separate curricula each taking up half of the year. The current text is "*Glencoe Health*" by McGraw Hill Education.

Health & Physical Education **(.5 cr.)**

This class meets three times per cycle, and is divided into two separate curricula. The physical education portion occupies roughly two thirds of the year, with health education taking up the remaining one third. The physical education course introduces the boys to a variety of activities that will form the basis for their adult fitness program. The five components of physical fitness are applied to these activities to give the boys an awareness of the importance of wellness in their lives. The health portion of the course is devoted to current topics including communicable diseases, cardiovascular disease and cancer, how to develop and maintain health relationships, and certification in cardiopulmonary resuscitation.

HISTORY

Philosophy and Overview

The History Department believes that history and social science are at the heart of a strong liberal arts education and, therefore, vital to the development of the essential qualities of a Haverford School graduate. It is through the study of history that a student can understand how the earth and humankind have come to be as they are today and to foresee how the lessons from the past can guide the interactions between peoples and nations in the future. Our core program is two years of global history followed by an in-depth study of United States history; subsequent electives allow students to closely investigate topics of particular interest. Throughout the program, students increase their curiosity, develop their capacity for critical and creative thinking, and expand their openness to new ideas and different ways of experiencing our common humanity.

The Department emphasizes the development of the following attitudes, attributes and skills:

- Read with an inquisitive, critical mind so as to explore material for authenticity and value
- Think critically so as to arrive at well-reasoned conclusions
- Communicate effectively orally and in writing
- Research effectively using both electronic and printed sources
- Apply sound note-taking, memorization, test-taking and other study skills
- Use technology to maximize learning
- Internalize an ethical, moral compass to guide decisions and actions
- Become a life-long student of history

The Department also recognizes the efficaciousness of using collaboration to educate boys by engaging them in major projects that involve research, writing, debating, and oral presentation skills. Among them are the Third Form Archeology Project, the Fourth Form World War I Trials, and the Fifth Form research paper.

Ancient World History **(1 cr.)**

This Third Form course is, at its core, an introduction to topics in ancient and classical civilizations. With a strong focus on historical analysis and foundational skills in the freshman year, the course will systematically address: effective reading of texts; note-taking, from both reading and class; writing the analytical essay; research techniques using library tools and methods; interpreting maps and other visual presentations; and making oral presentations, both formal and informal. The format of the course will include seminars, lectures, films/video, project-based learning, and other presentations.

Modern World History **(1 cr.)**

In a survey of world history from the 13th century to the present, this yearlong Fourth Form course will ask two intersecting and complementary questions: *what is "modern," and what processes made/are making the world modern?* The course centers on the development and interaction of western and non-western civilizations over this period, examining significant ideas, events, and persons from the multiple perspectives of political, economic, and social history. The students will approach modern world history both chronologically and thematically, using the six themes of (1) interaction between societies, (2) change and continuity over time, (3) technology and demography, (4) social structure, (5) cultural and intellectual developments, and (6) states and political identities.

The course uses and refines the academic skills taught in Third Form Ancient History. Debates, historical trials (World War I), research papers, analytical essays, reflections, and oral presentations are among the methodologies used in this course.

United States History **(1 cr.)**

This yearlong Fifth Form course covers the breath of American history from colonization to the present. Political, economic, and diplomatic developments are at the heart of the course, but social and intellectual history is covered as well. The course combines a traditional chronological approach with an emphasis on selected themes and topics including: the development of the United States as a world power; the socio-economic, racial, and ethnic diversity of American society; the development of the American political tradition (sectionalism, citizenship); and the role of government in the regulation of the economy. Readings include narrative history, news articles, primary sources, and other supplementary materials.

United States History* **(1 cr.)**
Prerequisite: Recommendation of teacher.

This is an advanced version of the classic survey course in United States History. The course provides a foundation for a sophisticated appreciation of the history of the United States, beginning with the settlement of the colonies and ending with the present day. Events are studied within the historical contexts of chronology and geography. Students will acquire a critical lens for the understanding of contemporary issues, such as the tension among liberty, equality, and justice. College-level texts, advanced work with primary and secondary sources, and work in historiography are hallmarks of the course. Aside

from preparing boys for success on national examinations, we hope to inspire an active and inquiring sense of citizenship.

African American Studies **(.5 cr.)**

In this course we consider African-descended people's social, political, economic, and cultural experiences in the United States. It introduces the fiercely contested journey from the margins to the center of intellectual discourse, which is critical to provide a framework to understand the revival of civil rights. Particular attention will be paid to the development and evolution of the field of African American history, using race, class, gender, sexuality, and religion as essential categories of analysis. We will use student experiences to frame historical contexts of colonial independence, plantation and Antebellum South, Reconstruction, the Nadir period, the Civil Rights era, and the Cold War. Some questions to be tackled include: Are racial and gendered exclusions of African Americans wired into American society's historical legacies and present-day practices? What problems are posed by under-privileging African American history? The course will rely heavily on student-led discussions. Each participant must prepare a presentation introducing the class to one of the weekly primary texts or supplemental readings listed on the syllabus. Throughout the course, assessments shall include book reviews, a group film review, an oral history project, and an effective research essay at the end of the semester.

Contemporary International Relations **(.5 cr.)**

The 21st century has been characterized by rapid change and increasing globalization, impacting individuals in societies in unprecedented ways and creating complex global political challenges. This one-semester survey course explores the intricacies of how global leaders in the international community must balance past interactions and future projections while making present choices. Using specific case studies and current events, as well as participating in a semester-long online simulation while competing for class credit, students will confront IR concepts in real time. Topics will include different political theories, decision making, the role of international organizations, and major geopolitical moments that have shaped the current world order.

European Dictators* **(.5 cr.)**
Prerequisite: A- in American History and recommendation of teacher.

This is a one-semester advanced course for Sixth Form students. It will focus on 20th century Europe between the world wars with special attention to the rise of totalitarianism and the conditions and events that paved the way to power for Benito Mussolini in Italy, Joseph Stalin in the USSR, Adolph Hitler in Germany, and Francisco Franco in Spain. In addition to traditional history books such as *European Dictatorships: 1918-1945*, we will make use of memoirs such as Orwell's *Homage to Catalonia,* Levi's *Christ Stopped at Eboli*, Solzhenitsyn's *One Day in the Life of Ivan Denisovich*, Picasso's *Guernica,* and films like the Christopher Isherwood-inspired *Cabaret* and Leni Riefenstahl's classic and chilling documentary *Triumph of the Will*.

Global Financial Markets and Investments **(.5cr.)**

Global Financial Markets and Investments will provide students with a firm understanding of the concepts and practices associated with making sound investments and navigating financial decisions in adulthood. We will contemplate topics such as world markets and related indices, financial statements, financial instruments, personal finance, financial institutions, and financial crises of the past and present. On a weekly basis, students will also evaluate particular current events and examine the positive or negative results on stock price and the broader economy.

Government and Politics **(.5 cr.)**

This course will present an introduction to the study of government and politics and will prepare students to become active and engaged citizens. Our studies will begin with the many forces that influenced the writing of the United States Constitution. From there, we will learn about the organization of the federal government, including the political, media, and electoral forces that dictate its behavior, before discussing various issues arising from current demographic, economic, and political trends. Throughout, the course will also focus broadly on current events and deeply on certain issues of immediate import. This course will make use of news organizations, periodicals, political scientists, and various data journalism experts and will culminate in a final research project.

History of Global Health (*honors option upon permission of instructor*) **(.5 cr.)**

In this course, we will trace the emergence of public health practices, systems, and ideas from the 19th to the 21st centuries as a critical part of a broader history of epidemics, empire, and global mobility. We will explore these developments as they emerge at the intersection of Western and non-Western understandings of health, medicine, and the body; imperial health goals; decolonization and development initiatives after World War II; the rise of modern biomedicine and pharmaceutical industries; and the shift from "international health" to "global health." Over the semester, we will examine themes of commodification, expertise, autonomy, agency, and disability as they emerge in such topics as tropical hygiene, eugenics, biosecurity, sexual and reproductive health, and in the management of diseases ranging from malaria, smallpox, and polio to HIV and Ebola. Students will be required to write short response papers to readings, co-lead a class discussion, and write an op-ed that uses a historical case to help illuminate a pressing issue of global health in the present.

History of Science, Sex, and Culture* **(.5 cr.)**
Prerequisite: A- in American History and recommendation of teacher.

This course will focus on issues of gender and sexuality from the late 19th century to the present. With particular attention to how science has transformed understandings of human sexuality, reproduction, and sexual difference, we will consider such questions as: How have biological understandings of male and female bodies changed? How did wars and epidemics change the stakes of sex for families, nations, and

medicine? How did race, class, religion, and age inflect discussions about masculinity, femininity, and sex? Topics will include the history of eugenics, public health programs, social movements (i.e. Civil Rights, Women's Rights, Disability Rights, LGBTQ), "the pill", prostitution, Men's health, regulation of pornography, and assisted reproduction. The course will be based on a broad range of interdisciplinary readings, documentary films, and primary sources. This is a project-based class and will culminate in an original final project (paper, exhibit, or documentary film) on a topic chosen by the student.

History and Sociology of Sport **(.5 cr.)**

This course will explore the historical development of sport from ancient times to the present. We will investigate sport as a site in which issues of nationalism, race, class, gender and sexuality were reinforced and also challenged. While the scope of the course is broad, it will primarily focus on key debates and turning points of Western sport in the 19th-21st centuries. Topics will include: violence and sport, sports activism, amateurism vs. professionalism, youth sports pipelines, commercialization of sport, Title IX, performance enhancement and its regulation, and evolving athletic technologies (from the artificial limb to Nike Vaporfly shoes). Beyond reading secondary literature, analyzing primary documents, watching documentary films, and participating in discussions and small projects, each student will also lead a class discussion and perform original research and writing (or create a final multimedia project) on a topic of their choice.

Social Psychology **(.5 cr.)**

This course for Fifth and Sixth Form students examines the principles of social psychology: that is, how individuals think, feel, and behave in regard to other people and how individuals' thoughts, feelings, and behaviors are affected by others. The course will concentrate on the process of social thinking, such as motivation, leadership, conformity, obedience and persuasion, and social relations, including aggression, altruism, prejudice and attraction. General principles of coping, grouping identities, and social stress will be discussed. In addition to readings from the text, the course will include discussions of "case studies," film presentations and journal writing.

INDEPENDENT STUDY & ADVANCED RESEARCH STUDIES

Independent Study (IS) is traditionally offered for Sixth Form students wishing to pursue an area of academic interest which is not currently offered in a formal traditional course. Students interested in pursuing an IS should follow the below steps, during the Spring in which Course Request Forms are submitted for the upcoming academic year:

1. Meet with the respective Department Chair of the subject in which the Independent Study would be sponsored to present a brief overview of the topic, term(s) in which the IS would be scheduled, credits assigned to the IS, and the faculty mentor to whom would oversee your work and final project.
2. Once the Department Chair has approved the initial framework, an Independent Study Proposal should be submitted **by June 1st of the prior academic year** in which the IS will be scheduled. The Department Chair will provide students with the IS Proposal Form after the initial meeting.
3. The IS Proposal will be reviewed by the respective teacher, Head of Upper School, Director of College Counseling, and the Department Chair for final approval.
4. If the IS is approved, the course will be added to your schedule over the summer along with your other traditional classes.
5. In the IS is not approved or requires edits based on feedback from the IS Committee, students are responsible for submitting an updated proposal within the timeframe requested from the Committee.

Independent Studies cannot be proposed after the school year has begun.

Advanced Research in History

The Advanced Research Program in History (ARPH) is designed to offer rising Sixth Form scholars the opportunity to conduct research and write an academic thesis on a topic of their choice.

Advanced Research Program in History* **(1 cr.)**
Prerequisite: Permission of department.

The program is open to students who have demonstrated a sustained interest in history over the course of their careers at Haverford and who are excited to engage in a full year of study, reflection, and writing on a historical topic that is meaningful to them towards the goal of producing an advanced thesis paper. Topics may range from the recent cultural history of R&B to the politics of medieval cuisine (and everything in between) and are only limited by available sources and imagination. ARPH begins in early spring of Fifth Form and ends the following April when the final thesis is due. This half-credit course meets for one or two meetings per cycle from September to April and entails a major commitment to reading over the summer and throughout the school year. Students who apply for this course and are approved by the History Department will sign up during course selection meetings in March.

Advanced Laboratory Research Cooperative in Science

Advanced Laboratory Research Cooperative* (Science) **(1 cr.)**
Prerequisites: Successful Completion of Chemistry and Biology* with final grades of A- or better. Students will apply and be selected for this course by the Science Department during the the Fifth Form year. Academic achievement, discipline record, attendance record, and input from past and current instructors will be considered during the application process. Formal invitations to enroll will be extended by the lead instructor and/or the Science Chair.*

The Advanced Laboratory Research cooperative gives highly engaged science students the opportunity to experience research firsthand at regional research labs. Boys will learn about several scientific fields via exploration as well as reading and discussion of selected current scientific research. Once they have identified an area of interest, the boys will investigate opportunities for placement in a cooperating local university or private laboratory for an eight to ten-week summer research experience. Upon successful completion of the summer portion of the course, boys will reconvene in the fall for time devoted to organization, analysis, evaluation, and interpretation of their data. The boys will discuss each other's data in a presentation/seminar format and begin preparations for presentation of their research experience to the Haverford School community. Students will meet with the research advisor at least one block each cycle. They will be expected to work independently between meetings. *This course will be scheduled in addition to the students' regular class load.*

INTERDISCIPLINARY STUDY

Global Perspectives with Travel with Travel to Guatemala *(Spring – Fifth & Sixth Form)*

This four-unit course bridges interdisciplinary classroom learning with experiential and immersive travel, encouraging students to absorb and engage with new perspectives, foster independence and creativity, and inspire self-reflection. In the first unit, students will explore the foundations of citizenship in various societies, ancient and modern. The second unit will consist of projects relating to the United Nations' Sustainable Development Goals and will guide students to ponder the current state of our world through statistical models and scientific analysis. In the third unit of study, before the class' journey abroad to Guatemala, the students will consider the country's current events, geopolitics, literature, culture and history through readings, class discussion and journaling. The course culminates with the opportunity for the student to delve into a significant research project of interest related to Guatemala. The Director of Global Studies will lead the class and numerous faculty members will guest lecture on areas specific to their expertise. This semester elective includes travel to Guatemala over Spring Break and it is strongly recommended that students who enroll in the course travel with the class. *There is an added cost to enroll in this course that will cover all travel expenses. That cost will be published when enrollment is finalized in early fall. See the Financial Assistance Policy for Global Studies Programs for more details.*

MATHEMATICS

It is clear that the chief end of mathematical study must be to make the students think.

—John Wesley Young

Philosophy and Overview

The Upper School mathematics program sets forth clear, high-quality academic benchmarks that all **students must master by the end of each course. These are designed to exceed the Pennsylvania Common Core Standards** in their respective subjects. The Haverford School's expectations are rigorous, relevant to the real world, and reflect the knowledge and skills our graduates will need to be well prepared for the mathematical challenges in life beyond Haverford.

Each of our courses offers a comprehensive set of learning objectives with the common goal of developing competent problem solvers, effective communicators, independent learners, and confident critical thinkers; these are skills that extend beyond mathematics. We are committed on an ongoing basis to improving the mathematics offerings available to our students. To that end, our instruction and curricula are monitored and adjusted to best serve our charges – the future global citizens of the 21st Century.

About Algebra I and Geometry

Algebra is important as a modeling and problem solving tool, and it bridges the gap from computational mathematics to abstract understanding. Geometry introduces the spatial relationships that exist in two and three dimensions. The concepts learned in these introductory courses are used by each of us every day - albeit unconsciously - and form the foundation upon which subsequent math courses are built.

Algebra I **(1 cr.)**

Algebra I is an introductory course designed for incoming Third Formers who have had little or no algebra or who need a thorough review of basic algebra.

The topics explored during the school year consist of:

- Problem solving skills
- Variables and proportions
- Linear graphs and equations
- Multiple representations of linear situations
- Multiplications of algebraic expressions
- Solving systems of linear equations
- Quadratics, including factoring expressions, graphing functions, and solving equations

- Solving and graphing linear inequalities
- Simplifying rational expressions
- Using laws of exponents
- Using function notation
- Appropriate use of a graphing calculator for the topics listed above

Geometry **(1 cr.)**

This course provides a comprehensive introduction to Euclidean geometry. A solid foundation in Algebra I is required.

The topics to be covered will include:

- Foundations of geometry
- Polygons
- Circles
- Coordinate geometry with transformations
- Inductive and deductive reasoning
- Mathematical proof
- Congruence and similarity
- Area and volume

Geometry* **(1 cr.)**

This course provides a thorough year-long study of Euclidean geometry at an advanced level for qualified students from Third and Fourth Form. The course includes all of the foundational components of the standard course. Students will also be expected to connect concepts, and the most successful students will solve problems creatively. A mastery level understanding of Algebra I and a teacher recommendation are required to register for the course.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- A rigorous treatment of mathematical proof
- Justification of the major theorems of the course
- Vectors
- Circle theorems

About Algebra II

The Haverford School offers two levels of Algebra II - Honors and Standard. The goal of each is to expand and deepen your existing knowledge of Algebra I and Geometry; both courses emphasize the computational and theoretical components of the subject matter. Successful completion of these courses will satisfy the Common Core requirements for Algebra (as set by the Pennsylvania Department of Education) and will prepare students to tackle more advanced coursework in the future.

Algebra II (1 cr.)
Prerequisite: Geometry

This yearlong, standard level course is intended to meet (and surpass) the Common Core requirements. This is an exhaustive curriculum with particular emphasis on the practical/computational components of the subject and on the use of functions as mathematical models for solving real-world problems.

In particular, the topics to be covered will include (but not necessarily limited to) the following:

- Properties of sets of numbers and number systems
- Solving equations, inequalities, and absolute value problems
- Functions, relations, and their graphs
- Combinations and transformations of functions
- Inverse relations and functions
- Linear functions and systems of linear equations
- Quadratic functions and introduction to complex numbers
- Properties of higher-order polynomials
- Radical functions and rational exponents (roots and powers)
- Exponential and logarithmic functions
- Rational functions
- Functions as mathematical models
- Elementary probability

Algebra II* (1 cr.)
Prerequisites: Geometry and teacher recommendation OR Standard Geometry with a grade of A for both semesters and teacher recommendation. Students should also have demonstrated proficiency in their previous Algebra I course. The department reserves the right to administer Algebra Readiness tests to measure competency.*

This yearlong course covers the topics outlined above, but in a much more rigorous fashion. There are a number of additional topics presented as well. One of the distinguishing features of this course over its standard counterpart is the greater commitment in both time and effort required for success. This course delves much deeper into the theory behind the basics and contemplates a wider range of topics. The curriculum reaches well beyond the Common Core requirements and prepares the students to tackle Precalculus at the honors level the following year.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Domain and range of functions and their inverses
- Systems of inequalities and absolute value equations
- Families of functions; transformations and graphs; end behavior of functions
- Quadratic equations (using advanced factoring techniques)
- Complex numbers/operations
- Systems of quadratic equations/inequalities
- Exponential and logarithmic functions using *e* and change of base
- Rational functions and their graphs – asymptotes, discontinuities, intercepts, roots and end behavior
- Conic sections – transformations and graphs
- Functions as mathematical models (using technology/software to solve real-world problems)

About Precalculus

Precalculus builds on the concepts from Algebra and Geometry to create the foundation for the study of calculus and is offered in Standard and Honors levels. This challenging course includes an examination of many types of functions including trigonometric, exponential, logarithmic, rational, quadratic, and higher - order polynomials. Students will be challenged to examine mathematics graphically, algebraically, verbally and numerically. The use of the graphing calculator will be required in this course, and students will be expected to know the five basic graphical functions: minimum, maximum, value, zero, and intersection.

Precalculus
Prerequisites: A grade of B or higher in Algebra II and teacher recommendation.

This course provides a comprehensive preparation for the study of calculus at Haverford or an introductory calculus course in college. This course requires a strong working knowledge of all the material from Algebra II, i.e. of linear, quadratic, higher-order polynomial, rational, exponential, and logarithmic functions. The concepts of trigonometry, sequences and series, and combinatorics will be developed. Mathematical models - solving real-world problems - requiring both algebraic and numerical methods will be emphasized throughout.

Taken from College Preparatory Mathematics, CPM:
Third Edition *Precalculus* meets all of the standards for a Common Core 4th Year high school math course, and includes an introduction to calculus with functions, graphs, limits, area under a curve, and rates of change. The course is designed similarly to the CPM Core Connections courses. On a daily basis, students work collaboratively with others as they use problem-solving strategies, complete investigations, gather evidence, critically analyze results, and communicate clear and effective arguments while justifying their thinking.
The course is well balanced among procedural fluency (algorithms and basic skills), deep

conceptual understanding, strategic competence (problem solving), and adaptive reasoning (application and extension). The course embeds the CCSS Standards for Mathematical Practice as an integral part of each lesson in the course. With the emergence of new technology, many lessons have moved beyond a traditional handheld device and are written with Desmos eTools as an integral component. The curriculum contains several key labs and hands-on activities throughout the course to introduce and connect concepts, with an emphasis on modeling.

The course starts with lessons that introduce the following big ideas of the course: functions, trigonometry, modeling, algebraic manipulation, rates of change, and area under a curve. Each of these major topics reemerges later in the course for students to revisit using new knowledge. For instance, the spring lab introduces modeling with mathematics, teamwork, and periodic functions early in the course. Then it is revisited two more times, connecting the situation to exponential decay and writing equations of trigonometric functions. The dirt bike course introduces area under a curve, optimization, and piecewise functions. This situation reemerges connected to instantaneous rates of change.

Precalculus* (1 cr.)

Prerequisites: A grade of B+ or better in Algebra II or A or better in Algebra II and teacher recommendation.*

This course covers all of the topics in Standard Precalculus with additional and/or enhanced coverage of conic sections, parametric equations, polar coordinates, vectors and the complex plane. Honors Precalculus is fast paced and requires a mastery of all previously studied skills. Connections with the sciences, economics and other real world applications are developed throughout. This course will also develop the student's skills in the use of the graphing calculator, in all of its modes.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Advanced trigonometric functions - graphs of tangent, cotangent, secant, cosecant and their inverses; half-angle formulas, product-to-sum formulas
- Advanced applications of conic sections - working from first principles, i.e. definitions of foci, directrices and eccentricity
- Parametric equations - graphs and applications
- Polar coordinates and graphing polar equations
- Vectors and vector operations in 2 and 3 dimensions - dot and cross product, components of vectors, lines and planes in 3-space
- Complex numbers - trigonometric form, De Moivre's Theorem
- Advanced treatment of sequences and series - tests for convergence of infinite series, mathematical induction
- Introduction to calculus - limits, continuity, tangent line to a curve

The following mathematics courses are primarily for Fifth and Sixth Form students and require departmental approval to enroll.

About Calculus

Inspired by problems in celestial mechanics, Newton and Leibniz developed the ideas of calculus more than 300 years ago. Since then, each century has extended the power of calculus to illuminate questions in mathematics, the physical sciences, engineering, and the social and biological sciences. Calculus is a powerful tool for reducing complicated problems to manageable procedures.

The Haverford School offers two levels of calculus: Standard and Honors. The goal of both courses is to provide students with a clear understanding of the ideas of calculus as well as provide a solid foundation for subsequent courses. Both courses require a strong working knowledge of material from Algebra II and Precalculus, the ability to work independently, and include both computational and theoretical components.

Calculus (1 cr.)
Prerequisites: A final grade of B+ in Precalculus or the recommendation of your current teacher.

Calculus begins with a brief review of functions including logarithmic, exponential and trigonometric. After developing the ideas of limits and continuity, the course will focus on the major concepts of differential and integral calculus. Students will learn methods for taking derivatives and antiderivatives and use these methods in various applications. Although not as theoretical as Calculus I*, this course requires a strong working knowledge of previous courses, the ability to work independently, and a desire to learn higher mathematics. The students will use the graphing calculator as well as various online resources.

In particular, the topics to be covered will include (but not necessarily limited to) the following:

- Limits of functions-- graphically and algebraically
- Definition of derivative-- instantaneous vs. average rate of change; slope and equation of the tangent line
- Differentiation techniques-- polynomials, trigonometric, and transcendental functions; implicit differentiation
- Applications of derivatives-- displacement, velocity, and acceleration; optimization; related rates
- Integration-- Riemann sums, definite and indefinite integrals, u-substitution
- Applications of integration-- area under and between curves; accumulation

Calculus I* (1 cr.)

Prerequisites: A grade of B or above in PreCalculus and teacher recommendation OR a final grade of A in PreCalculus and teacher recommendation.*

This course is a thorough and challenging development of differential and integral calculus. In addition to numerous applications, this course includes a theoretical component and advanced methods of differentiation and integration that will not be covered in Standard Calculus. This course will prepare students to take Calculus II* at THS or move into a more theoretical calculus course in college, such as those required for mathematics, engineering or applied science majors. It is anticipated that students, having successfully completed Calculus I*, may successfully sit for the Calculus AB Examination in the spring.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Limits of functions-- graphically and algebraically
- Definition of derivative-- instantaneous vs. average rate of change; slope and equation of the tangent line
- Differentiation techniques-- polynomials, trigonometric, and transcendental functions; implicit differentiation
- Applications of derivatives-- displacement, velocity, and acceleration; optimization; related rates
- Integration-- Riemann sums, definite and indefinite integrals, u-substitution
- Applications of integration-- area under and between curves; accumulation
- Differential equations
- Slope fields
- Exponential growth and decay models
- Simpson's Rule, Trapezoid Rule
- Additional integration techniques, integration by parts
- Volumes of revolution, disc, shell, and washer methods

Calculus I with Engineering Applications* (1 cr.)

Prerequisites: A grade of B or above in PreCalculus OR a final grade of A in PreCalculus. A grade of B or above in Chemistry* or a final grade of A in Chemistry. Enrollment contingent on recommendations from current teachers and permission of the Math and Science Chairs.*

This course is a thorough and challenging development of differential and integral calculus with a specific focus on engineering applications. It is designed for students who are seriously considering any engineering discipline as a college major. This course will include a theoretical component and advanced methods of differentiation and integration that will not be covered in Standard Calculus. Students will also complete an applied component that requires them to prepare calculation-based designs, build working prototypes to gather and analyze data, and/or test engineering solutions. Projects will address engineering

problems relevant to practicing engineers and adhere to specific design and economic constraints. Students should ***expect*** frequent and challenging assignments and projects throughout the course.

Completion of the course will prepare students to take Calculus II* at THS or move into more theoretical calculus courses in college, such as those required for mathematics, engineering or applied science majors. It is anticipated that students, having successfully completed Calculus I with Engineering Applications*, may successfully sit for the Calculus AB Examination in the spring.

Calculus II* (.5 cr.)
Prerequisites: Calculus I and teacher recommendation.*

This is a rigorous and fast paced one semester course which builds on the foundation of Calculus I*. Topics covered include applications of differential equation to physics, engineering, and biology, infinite series, parametric and polar representation, and the foundations of vector calculus. It is anticipated that students, having successfully completed Calculus II*, may successfully sit for the Calculus BC Examination in the spring.

In particular, the topics to be covered will include (but not necessarily to be limited to) the following:

- Differential equations--separable equations, slope fields, Euler's Method, first-order equations and integrating factors
- Sequences and series--limits of sequences, numerical series, power series, Taylor series
- Parametrically defined curves - slope and arc length
- Polar curves--slope and area in polar coordinates
- Vector-valued functions--position, velocity, and acceleration in the plane

Mathematics Electives

Advanced Topics in Mathematics* **(.5 cr.)**
Prerequisite: Grade of B or higher in Calculus II.*

In this semester course we will explore the foundations of linear algebra and multivariable calculus, interweaving topics drawn from both subjects. We will begin with a study of three-dimensional vectors, continue on to matrices and determinants, and conclude with a treatment of functions of several variables, including partial differentiation, gradient and directional derivative, optimization, multiple integrals, and vector analysis. Applications will be drawn from physics, economics, and engineering.

About Statistics

In a society inundated with information, the ability to analyze and interpret data is an invaluable tool. Statistics provides the opportunity for students to learn how to make good decisions with data. Statistics permeates every branch of the natural and social sciences, and the ability to make inferences from statistical analysis is crucial in business, economics, political science and medicine. It is very likely that you will be required to take a statistics course in college and then use it in your career. The Haverford School offers two levels of statistics: Honors and Standard. Both courses are designed to meet (and exceed) the Data Analysis Core Curriculum requirements (as adopted by the Pennsylvania Department of Education); both will include computational and theoretical components dealing with descriptive and inferential statistical techniques. Students will be introduced to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Students are exposed to four broad conceptual themes:

- Exploring Data: Observing patterns and departure from patterns
- Planning a Study: Describing what and how to measure
- Anticipating Patterns: Producing models using probability theory and simulation, and
- Statistical Inference: Confirming models.

Statistics (1 cr.)
Prerequisites: Completion of an Algebra II course

This yearlong course is intended to provide students a framework to think about the world "statistically." Real-world problems will be solved using 21st century methodologies, i.e. by incorporating useful technologies and working collaboratively; the process will be project-based, highly interactive, and engaging. This course is open to Fifth and Sixth Form students. It is ideally suited for students who have completed FST or Precalculus and are now looking to expand their mathematical horizons. The course utilizes an online textbook for readings and exercises.

Statistics* (1 cr.)
Prerequisites: Completion of Algebra II with a grade of B+ or Precalculus and a teacher recommendation.*

This is a yearlong comprehensive survey of the foundations of probability theory and statistical methods for collecting, organizing, displaying, analyzing and drawing conclusions from data. Emphasis is placed on clear and accurate reporting of the results obtained from these activities. Statistics* is a demanding course (both in time commitment and complexity), open to qualified Fifth or Sixth Form students who wish to study statistics at a level comparable to a rigorous college course. It is anticipated that students, having successfully completed Statistics*, may successfully sit for the AP Examination in the spring. Technology will be used extensively for solving problems in the course. No specific textbook shall be required (although classroom copies of *Stats: Modeling the World* by: Bock, Velleman & De Veaux will be available for reference). Students may take this course concurrently with Calculus, Calculus I* or Calculus II*.

About Finance and Economics

Making sound financial decisions is an essential life skill, yet most people acquire it only with age and through a process of trial and error. Studying Finance and Economics will equip students with powerful mathematical and decision-making skills to help them take control of and proactively map their lives in an uncertain world. Clear financial and economic thinking will yield benefits for students of these subjects, as well as for society-at-large.

Finance: Financial Literacy **(.5 cr.)**
Prerequisite: Algebra II

Open to Fifth and Sixth Formers. This course is designed to introduce the student to basic financial literacy skills to help them make responsible financial decisions. Concepts covered include financial planning, bank accounts, credit and loans, wages and taxes, investments, and insurance. Students will gain the information and skills to implement a life-long plan for financial success. A major goal of the course will be to teach students effective problem-solving techniques using real world transactions, mathematical reasoning, and spreadsheet modeling.

Economics: Macro* **(.5 cr.)**
Prerequisite or corequisite: Calculus

This conceptually challenging elective covers the main ideas of macroeconomics, the study of the large-scale structure of the national and world economy. The mathematical level is comparable to that of an introductory college class in macroeconomics. Topics include national income accounting (GDP), economic growth, unemployment and inflation, the financial sector, money and banking, aggregate supply and demand, fiscal and monetary policy, and international finance.

Economics: Micro* **(.5 cr.)**

Prerequisite or corequisite: Calculus

This mathematically demanding elective covers the main ideas of microeconomics, the study of the decision-making processes of consumers and producers in a market economy. The mathematical level is comparable to that of an introductory college class in microeconomics. Topics include market equilibrium, elasticity, taxes and price controls, international trade, consumer and producer decisions, competition and monopoly, and externalities, such as pollution and global climate change.

Logic (*Fifth and Sixth Form*) **(.5 cr.)**

Prerequisite: Algebra II, or concurrent Pre-Calculus with the recommendation of teacher.

This semester-long course introduces students to methods of reasoning, inference, and argument. It is open to all students who wish to improve their abilities to think carefully and critically with respect to any claim with which they are confronted, whether that be claims of societal significance such as those pertaining to civic, economic, or political outcomes, or of cultural aesthetics such as those pertaining to art, food, and sports. Not only will students have the opportunity to develop and practice their analytical thinking skills, but they will also develop their understanding of the concepts, systems, and processes of logic and their metacognitive awareness of thought patterns and habits (both their own and others). Students will find many parallels between the methods developed in this course and the equation solving processes of Algebra and the proof processes of Geometry, as well the use of formal abstract language to generalize arguments and derive structure from repeated patterns. More specifically, students will learn the foundational principles of proof techniques that they may have seen in their core math courses such as Proof by Induction and Proof by Contradiction. In particular, students will learn to:

- contrast the nature of arguments from that of explanations, opinions, and beliefs,
- understand the principles of deduction vs induction including the conditions of validity and soundness
- identify and define logical fallacies
- make claims of equivalence and inference based categorical propositions and class using tools such as Venn Diagrams and the Boolean Square of Opposition
- apply the language of symbolic logic in formal proofs of validity

Math Modeling to Solve Social Challenges (*Fifth and Sixth Form*) **(.5 cr.)**

Prerequisite: Algebra II, or concurrent Pre-Calculus with the recommendation of teacher.

This semester-long course introduces students to the concepts and techniques of mathematical modeling. The course is designed to answer the fundamental question, "How can I use mathematics to better understand and solve real-world social challenges?" The course draws from skills students have acquired across all of their math experiences including those in Algebra, Trigonometry, Statistics, and some ideas of Calculus, though students need only have a strong working knowledge of material from Algebra II. More broadly, students will develop their abilities to:

- make sense of real-world problems,
- state and build from valid assumptions,
- target desired outcomes and define variables,
- use mathematical techniques to find solutions,
- analyze and model results,
- report conclusions and use the evidence they have acquired to argue compellingly a position

The course will address real-world social challenges such as housing disparities, food insecurity, educational outcomes, and equitable resource distribution.

Introduction to Computer Science **(.5 cr.)**

Corequisite: Concurrent enrollment in Geometry

This half-year course offers an introduction to computational thinking and programming skills through collaborative, open-ended authentic, and collaborative projects. Students will spend time examining how computing shapes society by investigating and debating issues such as cybersecurity, data privacy, and digital literacy. The course will also explore introductory programming concepts, first through block-based coding and eventually working towards text-based (Python or equivalent). Students will leave this course with an overarching understanding of computer science principles and prepare for further coursework if desired.

Course Overview

Depending on the schedule modality, major units/projects will include:

- *Algorithmic Thinking (Password Generator Project)*
- *Programming (Scratch Programming Project)*
- *Data Representation (Unintend'o Controler Project)*
- *Digital Media Processing (Image Filter Project)*
- *Big Data (TEDxKinda Project)*
- *Innovative Technologies (Prototyping the Future Project)*

Advanced Computer Science* **(1 cr.)**

Prerequisite: Completion of Introduction to Computer Science. Students who already have extensive expertise in programming may be recommended by the instructor and approved by the Department Chair.

This full-year course, intended for students with experience or interest in computer programming, offers the opportunity to deep-dive into programming concepts through a collaborative, project-based approach. This curriculum immerses students in Java programming topics (abstraction, algorithms, data structures, object-oriented programming, etc.) and prepares students for college coursework and potential careers in computer science. As they progress through the year, students will solve unique, real- world problems of increasing complexity to further hone and practice their programming skills.

Course Overview

Depending on the schedule modality, major units/projects will include:

- *Introductions (Avatar Creator Project)*
- *Primitive Control (Resource Finder Project)*
- *Strings and Iteration (Language Interpreter Project)*
- *Objects, Classes, and Methods (Disease Diagnoser Project)*
- *Arrays, ArrayLists, and 2D Arrays (Air Quality Analyzer Project)*
- *Inheritance (Hospital Locator Project)*
- *Searching, Sorting, and Recursion (Data Decoder Project)*

The following course progression may be used to determine your plan for each year.

Although not included in the chart, math electives are also available in Forms V and VI.

Form II	Form III	Form IV	Form V	Form VI
PreAlgebra	Algebra I	Geometry	Algebra II	PreCalculus
Algebra I	Geometry	Algebra II	PreCalculus	Calculus or Statistics or Statistics*
Algebra I	Geometry*	Algebra II*	PreCalculus*	Calculus I* and/or Statistics*
Geometry	Algebra II	PreCalculus	Calculus	Calculus I* or Statistics* or Statistics
Geometry	Algebra II*	PreCalculus*	Calculus I*	Calculus II* and/or Statistics*

MODERN & CLASSICAL LANGUAGES

Philosophy and Overview

The Modern and Classical Languages Department prepares boys to be leaders and citizens in their local, national, and global communities, where a command of multiple languages is not simply beneficial, but necessary. Our faculty engages students using traditional and modern methodologies rooted in the following interconnected principles:

Cross-cultural engagement and empathy: Learning a new language affords students the unique opportunity to gain perspective on cultures that differ in place and time. Simultaneously, understanding another language and culture encourages them to reflect on and better appreciate their own. Our collaborative program motivates boys to be open, inclusive, and empathetic.

Language acquisition: We aspire towards boys achieving proficiency in listening, speaking, reading, and writing in their respective languages while reaching the rigorous linguistic standards that we uphold. Our faculty fosters cross-cultural communication, inspires intellectual risk-taking, and instills confidence in students to navigate unfamiliar discourse.

Authentic experience: Our classes contextualize language study by incorporating meaningful and authentic resources. We value and intentionally provide immersive experiences that align with our curriculum and partner with the Global Studies program for students to connect with communities locally and abroad.

Chinese Program

Communicative language skills are the foundation of our Chinese program. By emphasizing listening and speaking followed by reading and writing, students accumulate common words and phrases quickly at the introductory level. Thematic units that emphasize real-life situations, such as ordering food, traveling, or making plans with friends, help students develop skills they can use immediately, as well as build a foundation to continue their studies in college and beyond.

Latin Program

The study of Latin at Haverford centers on the literature, history, and culture of the ancient Greek and Roman worlds. After learning the key vocabulary and grammatical structures of Latin, students move on to experience a set of classical texts that have shaped Western culture, and continue to shape our world today.

Spanish Program

The humanity of past and present Spain and the Americas and the study of those cultures undergirds our Spanish program. The students' acquisition of linguistic structures and new vocabulary builds the foundation for future immersion in the target language and growth into level-appropriate literature study, story creation, text analysis, and authentic oral dialogue.

Second Language Option

Upper School students are permitted to take two languages. Students seeking two languages should discuss this option with their current language teacher, their advisor, and the Language Chair.

Chinese I **(1 cr.)**

This introductory course is offered to students with little or no prior experience in Mandarin Chinese. Basic background information of the language such as tones, pinyin, and characters will be introduced. Vocabulary, grammatical structures, and cultural references will be taught and discussed at an elementary level. Students will learn to read simple passages and write in simplified and/or traditional Chinese characters. Throughout the year students will engage in basic communicative tasks related to daily settings.

Chinese II **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

This course helps students reinforce what they have acquired in Chinese I and continue to expand their skills in listening, speaking, reading, and writing, by studying a variety of texts covering different aspects of daily life, simple academic subjects, cultural settings, and limited written expressions. After finishing the course, students are to be able to communicate more comfortably and confidently on simple daily and academic subjects and to have acquired a solid reading and writing knowledge to get ready for studying semi-authentic and authentic Chinese texts at advanced levels.

Chinese III **(1 cr.)**

Prerequisite: B in Chinese II and department approval.

This course continues to build on skills, comprehension, and proficiency developed previously in Chinese II. Students will participate collaboratively in guided conversations and presentations in both written and oral formats. The themes will be focused on daily-life topics throughout the year. They will develop strategies and language skills to talk about themselves and communicate with others on familiar topics in intercultural situations where Mandarin is used.

Chinese III* **(1 cr.)**

Prerequisite: A in Chinese II and department approval.

This Chinese III* class offers the same curriculum as the standard Chinese III class but is tailored for high-achieving students. The teachers design instruction and assessment with the expectation that students need little remediation in these areas. Students will be expected to communicate in greater depth.

Chinese IV **(1 cr.)**

Prerequisite: B in Chinese III and department approval.

This class is designed for students who have successfully completed Chinese III or III*. In addition to reviewing previously learned vocabulary and grammatical patterns, students will learn new ways to express themselves in Chinese. The main goal of the course is to improve students' levels of communicative competence in listening, speaking, reading, and writing in modern Chinese. By the end

of the course, students will attain approximately the Intermediate-mid level on the ACTFL proficiency scale.

Chinese IV* **(1 cr.)**

Prerequisite: B+ in Chinese III and department approval.*

This Chinese IV* class offers the same curriculum as the standard Chinese IV class but is tailored for high-achieving students. Teachers design instruction and assessment with the expectation that students need little remediation in these areas. Students will be expected to communicate in greater depth.

Latin I **(1 cr.)**

This introductory course examines the linguistic, cultural and historical traditions of the Greco-Roman civilizations. As a way to foster clear and logical thinking, Latin grammar, syntax and translation form the core of study. Since Latin is a basic constituent of the English language, the course examines vocabulary with particular emphasis on English derivatives and related definitions. Students also study mythological, historical and cultural themes in order to broaden their appreciation of the foundations of Western civilization.

Latin II **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

This course, offered to students who have completed Latin I in the Middle or Upper School, reviews the fundamentals of Latin I and introduces more sophisticated grammatical concepts requisite for success at the intermediate level. To introduce the art of translation, fables and mythological stories are read, as well as adapted selections from ancient literature. Emphasis is placed on precise analysis and expression in preparation for reading the original works of the Latin writers in Latin III.

Latin II* **(1 cr.)**

Prerequisite: A in Latin I and department approval.

Students who choose this course should be especially eager to continue their study of Latin and classical literature. While including the elements described for Latin II, the pace and depth of the curriculum are aggressive and presume an avid enthusiasm for scholarship. Students will complete the majority of Latin grammar while reading and translating extensive selections from classical and medieval literature. In addition, students will study the history and culture of ancient Rome in depth, using archaeological and epigraphic as well as literary sources.

Latin III **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

This course continues with the mastery of sophisticated grammatical concepts which are studied in the context of historical writings. With the text Duces Romanorum the students examine ancient Rome with an emphasis on its greatest leaders from its founding through the Republic. In the spring, particular emphasis will be placed on the works of Caesar.

Latin III* **(1 cr.)**

Prerequisite: B in Latin II and department approval.*

This course allows the student to apply his knowledge of Latin grammar, syntax and vocabulary to the reading, translating, analyzing and understanding of Latin literature from the late Republic. Particular emphasis will be placed on the works of Caesar and Cicero. In conjunction with our translations, students

will study the literary, cultural, intellectual and historical contributions of the ancient Roman world. This course, in comparison with the Latin III course, proceeds at an enhanced pace and depth.

Latin IV **(1 cr.)**
Prerequisite: Successful completion of previous level and department approval.

Students study the traditions of ancient epic by reading the Iliad, its ancient Latin translation, the Ilias Latina, and Vergil's epic poem The Aeneid. Selections are translated from the Latin, while other passages are examined and discussed in English. In addition to mastering Latin epic meter, students become familiar with Latin poetic style and its place in the Western literary canon. Through extensive translation and textual analysis, students develop their confidence in reading at sight and, by writing short papers and giving oral reports on relevant topics, they enhance their appreciation of poetic artistry.

Latin IV* **(1 cr.)**
Prerequisite: B in Latin III and department approval.*

Students study Vergil's epic poem the Aeneid in its historical setting as well as in its place within the traditions of epic genre. Selections are translated from the Latin, while other passages are examined and discussed in English. In addition to mastering Latin epic meter, students become familiar with figures of speech and Vergil's unparalleled poetic style. Through extensive translation and textual analysis, students develop their confidence in reading at sight and, by writing short papers and giving oral reports on relevant topics, they enhance their appreciation of Vergil's artistry. This course, in comparison with the Latin IV course, proceeds at a greatly enhanced pace and depth.

Latin V* Prose (*fall*) **(.5 cr.)**
Prerequisite: Department approval, B in Latin IV or B+ Latin IV.*

In this course students will have the opportunity to read and study a variety of Roman prose writings including history, political commentary, philosophy and letters. The works of authors such as Livy, Tacitus, Suetonius, Caesar, Cicero and/or Pliny will provide the basis for a more thorough understanding of the Roman Republic and Empire. The prose selections will enable students to improve both their reading fluency and literary analysis skills as they gain a better appreciation of Roman culture, history and literature.

Latin V* Poetry (*spring*) **(.5 cr.)**
Prerequisite: Department approval, B in Latin IV or B+ Latin IV.*

In this course, students will have the opportunity to read and study a range of Roman poetry including epic, lyric and satire. The works of authors such as Ovid, Catullus, Martial and/or Juvenal will offer the student insights into Roman thinking about politics, love, everyday life, mythology and poetry. The poetry will enable students to improve both their reading fluency and literary analysis skills as they gain a better appreciation of Roman culture, history and literature.

Spanish I **(1 cr.)**

This course is designed for the student who has had little or no prior exposure to the Spanish language. It emphasizes the acquisition of fundamental practical vocabulary, a solid foundation in basic grammatical structures, a detailed study of the verb system and the development of sound pronunciation and speaking skills.

Spanish II **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

Students enrolled in this course have successfully completed Haverford's first year of the language. In Spanish II, students will continue to build a solid foundation in the fundamentals of grammar and in the acquisition of a practical, useful, contemporary vocabulary for oral and written communication in a variety of everyday situations. Furthermore, through various cultural explorations, students will continue to expand their knowledge of Hispanic cultures. Students participate in daily oral drills, complete translation exercises, read short passages and write one-page compositions. Throughout the year, the students continue to expand their vocabulary and strengthen their precision both in speaking and writing, and gain mastery of the future, conditional, imperfect and perfect tenses.

Spanish II* **(1 cr.)**

Prerequisite: A in Spanish I and department approval.

Students enrolled in this course have successfully completed Haverford's first year of the language, and are prepared for the significantly faster pace of this course. Students in this class will master the future, conditional, imperfect and perfect tenses of the indicative mood, and will also undertake a thorough study of the present subjunctive. The class will be conducted almost entirely in Spanish, unless the explanation of a complex grammatical concept demands otherwise. Students will engage in oral drills, and translation exercises, and will create presentations and one-page compositions. The class will read and discuss short literary passages and current articles relevant to Hispanic culture.

Spanish III **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

Students enrolled in this course have successfully completed Haverford's Spanish II curriculum. Spanish III begins with a thorough review of grammar covered in the second year. Students will then continue their study of more complex grammatical structures. Students will read longer passages, and sections of authentic literary works, and will engage in class discussion primarily in Spanish. In Spanish III, students complete their study of the Spanish verb system, and begin to apply their skills to a variety of exercises designed to promote greater fluency in spoken and written Spanish.

Spanish III* **(1 cr.)**

Prerequisite: B in Spanish II and department approval.*

This course is designed for students who have successfully completed Haverford's Spanish II* curriculum. Emphasis in Spanish III* is divided among five basic language skills: listening comprehension, speaking, reading, writing, and cultural understanding. This third-year course begins with a review of second year skills and introduces appropriate new material to help students improve their command of grammatical structures, active and passive vocabulary, and comprehension of both literary and non-literary written Spanish. Short stories, films, and newspaper articles are incorporated into the curriculum, in order to foster greater understanding of Hispanic culture, and to help the student develop the skills necessary to express himself in spoken Spanish. Students in Spanish III* make the transition from sequential materials used at the previous levels of language instruction to the ability to express themselves creatively in oral and written Spanish.

Spanish IV **(1 cr.)**

Prerequisite: Successful completion of previous level and department approval.

The objective of this course is to help the students to convert the linguistic skills acquired during the three previous years into a coherent, clear, and useful means of communication. It prepares students to converse at length and handle everyday situations with confidence. Students view films in Spanish, and read literary works from world-renowned Spanish and Latin American authors. They also use the Internet, magazines and newspapers to read about current events in the Spanish speaking world. The films, literary readings and articles are the basis for classroom discussion and provide students with a general understanding and appreciation for the Hispanic culture. By the end of this course the student should have developed the self-assurance and confidence necessary for using the target language in informal conversations, or before a variety of audiences, ranging from a small circle of friends to a full class.

Spanish IV* **(1 cr.)**

Prerequisite: B in Spanish III and department approval.*

This is an interactive course involving advanced vocabulary and grammatical structure, as well as intensive study and usage of the Spanish language. Students in this class will continue to develop greater proficiency in all four language skills: listening, reading, writing, and speaking. Students in Spanish IV * will discuss contemporary news, cultural topics, literary readings, and films in Spanish. The goal of this course is to help students achieve fluency, and, as such, it will enable students to communicate with greater confidence, giving them the tools they need to handle day-to-day situations in a contextualized setting.

Spanish V: Cine del mundo hispano **(.5 cr.)**

Prerequisite: Successful completion of previous level and department approval.

This course addresses themes relevant to the 21st century in the Hispanic world, many of them polemic in nature. Topics include immigration, oppressive government regimes, global responsibility and

regionalism versus globalization. Students learn the skill set necessary to watch, understand and interpret Hispanic film and ultimately enabling the students to view films critically and as empathetic global citizens. Advanced grammar and vocabulary will be reinforced through discussion and composition.

Spanish V: Conversación y Controversia **(.5 cr.)**
Prerequisite: Successful completion of previous level and department approval.

In this semester-long course, students will explore global issues through the literature, art, history, politics, film, and culture of the Spanish-speaking world. Particular emphasis will be placed on developing speaking skills, but students will be required to complete nightly readings in order to participate effectively in class. Readings will be aimed at helping students develop cultural empathy and an understanding of current world events, and will include newspapers, blogs, and other internet sources, as well as literary works. In addition to daily class participation, students will be expected to work individually and in groups on diverse oral projects such as podcasts, presentations and debates. Additionally, several films will be chosen to complement the themes of the texts explored in class.

Spanish V*: Latinoamérica en el siglo XX **(.5 cr.)**
Prerequisite: B in Spanish IV and department approval.*

This advanced class will use the literature, art and film of the last century to explore the role of political and economic events in the Spanish-speaking world, in particular the political changes, economic crises and social movements that have influenced and affected countries such as Chile, Guatemala, Venezuela, Cuba, Argentina and México. The content of this course will be tailored to student interest and current events. Students will be exposed to the unique voices of short story writers, journalists, poets, artists and filmmakers whose work was informed by these events. Students will also gain insight into the socio-political antecedents and repercussions of these critical events.

Spanish V*: Literatura y cultura latinoamericana **(.5 cr.)**
Prerequisite: B in Spanish IV and department approval.*

In this course students will explore Latin American culture through literature. The short stories of such authors as Rulfo and Márquez will transform the reader's understanding of the human experience. This advanced course is dedicated to reading and interpreting literature of the Spanish speaking world with particular emphasis on the short narrative. Immersed in the target language, students will participate actively in discussions and write reflections on literary and social justice topics. Students will explore the historical, cultural, and literary influence of various authors from all over Latin America and Spain through the 21st century.

SCIENCE

Philosophy and Overview

The Haverford School Science Department strives to produce graduates who can synthesize, analyze, and think critically about concepts within the realm of science and across disciplines. We want to develop men who understand that science is an active and ongoing process and emphasize their responsibilities as global citizens, including but not limited to the stewardship of their environment, ethical decision making, and possession of varied perspectives.

We mold active learners who are capable of independent, cooperative, and collaborative work using the available technology and tools. We model and instill personal qualities that will sustain open-mindedness, creativity, imagination, and curiosity. We cultivate persevering, hard-working students who possess the confidence and resiliency to continue their study of science regardless of obstacles they may encounter. Through our courses we hope to nurture and help the boys to sustain the inherent awe, passion, and wonder that science can inspire.

Course Progression

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<tr><th></th><th>Physics</th><th>Chemistry</th><th>Biology</th><th>Interdisciplinary</th></tr>
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• Physics I: Problem-Based Approach</td><td></td><td></td><td></td></tr>
<tr><td>Form IV</td><td rowspan="2">• Physics II*: Applied Laboratory Physics
• Physics II: Astronomy
• Physics II*: Theoretical Physics
• Physics II*: Electronics</td><td>• Chemistry I
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<tr><td>Form VI</td><td>• Biology II: Anatomy and Physiology
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Physics

Physics is the fundamental science that allows students to understand the behaviors of matter, motion, and energy. The Haverford student begins his Upper School science journey with an exploration of basic physics, which provides him with the skills and knowledge for future courses in the Science Department.

After students complete their core sequence of Physics-Chemistry-Biology, they are encouraged to return to the study of Physics for more focused and mathematically-in-depth examinations. All courses provide students with opportunities for intellectual investigation, tactile experiences, and the development of vital critical thinking and problem-solving skills.

Physics I: Concept-Based Approach (1 cr.)

Students who are concurrently enrolled in Algebra or Geometry should enroll in this course.
Alternative placement requires permission of the Science Dept. Chair.

Physics I: Concept-Based Approach is an opportunity for students to learn how to engage in the study of science through laboratory investigations, reading, writing, problem-solving, and creative projects, both individually and collaboratively. These skills will be supported through the framework of fundamental pillars of physics such as motion, forces, conservation of energy, waves, and electricity. It is designed to be accessible to all III form students while still supporting the development of skills required for continued success in Upper School Science.

Physics I: Problem-Based Approach (1 cr.)

Students who are concurrently enrolled in Geometry or above should enroll in this course.*
Alternative placement requires permission of the Science Department Chair.

Physics I: Problem-Based Approach is an opportunity for students who already possess some proficiency in mathematics to examine introductory physics with more emphasis on problem solving and calculations. Students will engage in the study of science through laboratory investigations, reading, writing, problem-solving, and creative projects, both individually and collaboratively. These skills will be supported through the framework of fundamental pillars of physics such as motion, forces, conservation of energy, waves, and electricity. It relies on demonstrated math abilities while still supporting the development of skills required for continued success in Upper School Science.

Physics II: Applied Laboratory Physics* (1 cr.)

Prerequisites: Support of current math and science instructors and permission of the Science Department Chair are required for enrollment.
Corequisite: Precalculus or higher.

Physics II: Applied Laboratory Physics is an intensive, *year-long* course that provides further exploration of topics from Physics I while introducing a survey of additional topics common to a first-year college physics curriculum, including but not limited to kinematics, dynamics (Newton's Laws), gravitation, energy, momentum, oscillations, electricity, and/or magnetism. Materials will be presented at an fast pace with a strong focus on problem-solving. Students will develop their understanding of physics through both mathematical analysis and laboratory inquiry. Students should expect frequent and challenging assignments as well as intense collaborative project-based experiences.

Physics II: Astronomy (.5 cr.)

Prerequisites: Successful record in previous Science Department courses with endorsement of the current science teacher and/or permission of the Science Chair.

The purpose of this course is to introduce the student to compelling aspects of astronomy that they may be less familiar with, namely to those areas of our universe that extend beyond our local solar system. We will investigate such areas as cosmology, galactic morphology, stellar evolution, dark matter and energy, evidence for intelligent life beyond our solar system, and the ultimate fate of the universe itself. We will be utilizing one of the more definitive classroom texts about astronomy, Universe by Freedman and

Kaufmann. Our discussion will begin with a look at the origin and development of the universe and some of the largest-scale aspects of astronomy, effectively moving backwards through the book.

Physics II: Theoretical Physics* (.5 cr)

Prerequisites: Student must be co-enrolled in Calculus or higher and have a successful record in previous Science Department courses. Endorsement in this course is determined by recommendation of the Science Department and approval of the Science Department Chair.

Physics II*: Theoretical Physics is a *semester-long* course that offers a mathematically rigorous exploration of topics from Physics I while introducing a survey of additional topics common to a first-year college physics curriculum, using a strictly mathematical approach that often relies on calculus. Therefore, students will need to be proficient in algebra, trigonometry, and basic calculus. Topics include relativity, linear and circular motion, fluid dynamics, temperature and heat transfer, quantum physics, health physics, and much more. Derivations of notable physics equations will also be frequent as the course is geared to make students comfortable with the language of mathematics as it applies to physics. The course will be conducted at an accelerated pace with a strong focus on problem-solving. Students should expect frequent and challenging class assignments including group collaborations as well as reading and interpreting actual academic papers.

Note: Students might consider also taking Physics II: Electronics to complete a full year of mathematically intense physics.*

Physics II: Electronics* (.5 cr)

Prerequisites: Student must be co-enrolled in Calculus or higher and have a successful record in previous Science Department courses. Enrollment in this course is determined by recommendation of the Science Department and approval of the Science Department Chair.

This *semester-long* course provides an introduction to electricity and electronics with a focus on hands-on experience and practical applications. Electronics is one of the fastest expanding fields in research. From the invention of the transistor over seventy years ago to our current reliance on the "Information Superhighway," electronics has been a vital part of our modern technological society. The semester will begin with a look at the evolution of electronics over the last century. This will be followed by a thorough examination of the basic principles: voltage, current, resistance, Ohm's Law, Kirchoff's Law, etc. After a significant amount of time is spent on identifying and understanding how various electronic components work, students will design their own circuits. Using a solder gun and solderless breadboards, students will learn how to build analog circuits that accomplish particular tasks. Later in the semester, students will also have an opportunity to work with integrated circuits. Teamwork, critical thinking, and problem solving will be important attributes. Assessment will be based on tests, homework, and frequent lab reports addressing our various circuit projects.

Note: Students might consider also taking Physics II: Theoretical Physics to complete a full year of mathematically intense physics.*

Chemistry

Chemistry is the study of matter, its properties, and its interactions. It is the second component of the Upper School science sequence and is integral for a strong scientific foundation. Like Physics, it emphasizes problem-solving strategies, experimentation, teamwork, projects, and the fundamental principles of physical science. To that foundation it adds an understanding of modern theoretical concepts, relationships between structure and function, multi-step calculations, and qualitative and quantitative laboratory work. Chemistry provides students with an understanding of atomic and molecular structure, periodic properties of elements, reactions, stoichiometry, thermochemistry, solution chemistry, acids and bases, and equilibrium. We expect students who have completed a course in chemistry to have a firm grounding in experimental procedures, calculations, basic error analysis, and lab report writing skills. Calculators and computers with related software are frequently used for problem solving and data analysis.

Chemistry I (1 cr.)

Prerequisites: Successful completion of Physics I or permission of Science Department Chair

This is a broad introduction to, and overview of, the general principles and problem-solving techniques in the study of the composition of substances and the changes these substances undergo. The course focuses on building a solid and thorough foundation of fundamental chemical principles through a project-based curriculum. A high value is placed on students engaging in challenging laboratory and collaborative in-class activities. Individual reflection on their experiences is an essential component in support of the acquisition of disciplinary knowledge and skills. In this context, real world phenomena are used to frame student experiences and serve as the basis for the curriculum. Students are assessed both formatively and summatively on classroom participation and content application and mastery with a focus on developing cooperative learning skills. The course touches on all five major branches in chemistry: inorganic, organic, analytical, physical, and biochemical.

Chemistry I* (1 cr.)

Prerequisites: Final grade of A or better in Physics I. Student must be co-enrolled in Algebra II or above. Enrollment in this course is determined by recommendation of the Science Department and approval of the Science Department Chair*

This fast moving and very challenging course covers the topics in Chemistry with an added emphasis on more complex and mathematically intense problem-solving techniques and detailed applications to contemporary science and technology. Students are expected to be confident independent learners and have strong organization and study skills. Topics will be explored in more depth and at a faster pace than in Chemistry, and students may explore additional topics in Thermodynamics, Electrochemistry, and/or Reaction Kinetics. Students should expect frequent and challenging out of class assignments.

Chemistry II: Advanced Topics (.5 cr)

Prerequisites: Final grade of B or better in Chemistry I or an A- or better in Chemistry. Enrollment in this course is determined by recommendation of the Science Dept. and approval of the Dept. Chair.*

This second-year chemistry course will introduce fundamental concepts of organic chemistry, inorganic chemistry, physical chemistry, analytical chemistry, and/or biochemistry. Students can expect to explore topics in more depth than they experienced in the core Chemistry courses. Lab components of the course will introduce students to skills and techniques essential for experimentation in the field of chemistry. Emphasis will be placed on establishing connections to biology, material science, pharmacology, art, and other relevant applications. Understanding will be assessed with quizzes, tests, projects, and/or lab reports.

Biology

Biology is the study of living things and the mechanisms that shape their activities, growth, and evolution. It is the last of the science requirements for graduation and takes advantage of the experience students have acquired in their earlier physics and chemistry courses. Each student will gain a thorough knowledge of biological processes that apply to him and grow to have an appreciation for the richness of the natural world around him. Students will learn to think like a biologist by making careful, quantitative observations, asking good questions, forming testable hypotheses, designing and executing laboratory procedures, gathering, analyzing, and presenting laboratory data, developing scientific arguments, and coming to reasonable conclusions.

Once students complete a Biology I course, myriad opportunities for further study in Biology II are available. All biology courses place emphasis on learning to make informed decisions about biological issues affecting the individual and the community.

Biology I (1 cr.)

Prerequisites: Successful completion of Physics I and Chemistry I or permission of the Science Dept. Chair.

Biology focuses on building a solid and thorough foundation of fundamental biological principles such as cell biology, biochemistry, classical and modern genetics, molecular biology, evolution, and ecology through student-centered experiences. A high value is placed on engagement in challenging activities, collaboration with peers, and reflection on experiences, all of which support the acquisition of disciplinary knowledge. In this context, more opportunities for scaffolding the student experience and differentiated learning are possible. Students are assessed both formatively and summatively on classroom participation and content application and mastery.

Biology I* (1 cr.)

Prerequisites: Final grade of A or better in Chemistry I.* ***Students must complete summer work prior to the start of class.*** *Enrollment in this course is determined by the recommendation of the Science Department and approval of the Science Dept. Chair.*

Biology I* is a challenging and fast-paced course that covers the same biological principles as Biology I, but with considerably more depth of information. Students must be able to engage independently with the material and should be comfortable using their textbook and other sources for the acquisition of knowledge. Students must execute laboratory exercises or projects confidently and independently and are expected to incorporate these experiences into their overall understanding without prompting. Students are frequently assessed in a summative way, covering multiple textbook chapters at once, and focusing on content application and mastery.

Biology II - Anatomy and Physiology (.5 cr.)

Prerequisites: Successful completion of Biology I with endorsement of current Science teacher and/or permission of the Science Chair.

Biology II: Anatomy and Physiology examines topics related to the normal functions and components of humans and other living organisms such as body systems, locomotion, internal transportation of materials and/or reproduction. Classroom learning takes advantage of laboratory exercises and dissections to provide opportunities to engage with the topics more deeply. Students should be comfortable using multiple sources of information for the acquisition of knowledge. Student understanding is assessed by tests, laboratories, and projects.

Biology II - Cellular Physiology* (.5 cr.)

Prerequisites: Completion of Biology I with a grade of B+ or better.*

Enrollment in this course is determined by the recommendation of the Science Department and approval of the Science Department Chair

Biology II*: Cellular Physiology examines topics related to cellular functions of the human body focusing on defenses against disease, transmission of information, regulation of body functions, and/or reproduction. Classroom learning takes advantage of laboratory exercises and dissections to provide opportunities to engage with the topics more deeply. Students must be able to engage independently with the material and should be comfortable using multiple sources of information for the acquisition of knowledge. Student understanding is assessed by tests, laboratories, projects, and a research paper.

Biology II: Infectious Disease (.5 cr.)

Prerequisites: Successful completion of Biology I with the endorsement of current science teacher and/or permission of the Science Chair.

This course will examine the biology of infectious disease and thier interactions with our planet and its inhabitants. Course and lab work will focus on the intersections of molecular and cellular biology, microbiology, immunology, physiology, ecology, epidemiology, and principles of public health. Students can expect to gain a breadth of knowledge in these areas; depth of study for each topic will be determined by needs for student projects and student interests. To demonstrate understanding, students will independently research diseases with global significance.

Biology II: Molecular Biotechnology* (.5 cr.)

Prerequisite: Successful completion of Biology I with a grade of B+ or better. Enrollment in this course is determined by the recommendation of the Science Dept. and approval of the Science Dept.Chair.*

This course is a synthesis of several disciplines: biochemistry, genetics, cell biology, and microbiology. Biologists have the means to analyze the Human Genome. The dissection of the molecular pathway through which hereditary information flows between DNA, RNA, and protein molecules adds to our understanding of human development and disease. Technological developments have provided powerful methods to isolate, analyze, and manipulate DNA, RNA and protein molecules. These developments have transformed biological and medical research. Time will be mostly spent in the lab, learning and using molecular and cell biology research techniques to sequence a gene. Biotechnology will be provided to students, so they can learn theory, practice, and applications with hands-on experimental work. The curriculum may include applications of biotechnology such as genetic engineering, gene therapy, forensic science, and bioinformatics.

Engineering

Engineering is the application of science and mathematics to design and build solutions to complex problems. It is a discipline that makes the modern world tick. Students will build upon all of their experiences, integrating ideas from multiple disciplines and learning new ways of thinking.

There are two engineering course which can each be taken independently of one another. It is also possible for students to take both for a full year of Engineering study.

Engineering I: Engineering Applications (.5 cr.)

Prerequisites: Successful completion of Physics and Chemistry courses with endorsement of the current science teacher and permission of the Science Chair.

In this course, students will learn what engineering is and the types of projects engineers work on. They will explore the practical process philosophies that a good engineer must use. Through a series of real-world applications, they will investigate the complexities of the decisions faced by engineers and develop the thought processes that guide engineers through these problems. The students will complete team- based projects where they must deliver a product against a series of specifications, on-time, and to-cost.

Projects, which may vary year by year, will be based around a definable goal. The projects are rooted in the real world and through them the students will benefit from not only the hands-on engineering experience but also the development of life skills that are the hallmarks of good engineers.

Engineering I: Computer-Aided Design and Modeling (.5 cr.)

Prerequisites: Successful completion of Physics and Chemistry courses with endorsement of the current science teacher and permission of the Science Chair.

This course introduces a variety of computer models used in scientific and engineering industries. Foundational measuring and modeling skills will be taught and used to create blueprints, technical drawings, and 3D printed objects that are appropriately scaled. Models will be used under a variety of different conditions to analyze the physical, structural, thermal, electromechanical, and aerodynamic properties. Knowledge attained in this course will culminate in an independent final project where students examine real-world problems that requires students to create and/or analyze a complex computer model.

Environmental Studies

The study of the environment involves deep understanding of the physical, chemical, and biological systems that model and explain our world. Examination of these topics provides an important capston experience for students who enjoy the study of science and aspire to better understand the complexities of our planet and its interactions with humans

Environmental Science (1 cr.)

Prerequisites: Successful completion of Biology I with a B or Biology I with an A- or better. Enrollment in this course is determined by the recommendation of the Science Dept. and approval of the Science Dept. Chair.*

Environmental Science is an intensive, *year-long* course that engages with the scientific principles, concepts, and methods necessary to understand the complex relationship found within the natural world. In this interdisciplinary course, we will explore physics, chemistry, and biology topics learned in the core courses in more depth and qualitatively and quantitatively examine natural and human-made environmental problems. To do this best, we will introduce new material in topics such as atmospheric science, climate science, geography, geology, oceanography, zoology, and more. The course will have a laboratory component and, when possible, field work will be conducted on campus. Students should expect frequent and challenging assignments as well as intense collaborative project-based experiences.

Policy and Ethics of Environmental Challenges (.5 cr.)

Prerequisites: Successful record in previous Science Department courses with endorsement of current science teacher and/or permission of the Science Chair.

It is of paramount importance that Haverford students understand some of the most pressing environmental challenges that confront their generation in the new millennium. Essential global issues such as water scarcity, peak oil, climate change, and much more will be explored. Local issues in the state of Pennsylvania involving hydraulic fracking and environmental justice will also be discussed. We will take a holistic approach to confronting environmental challenges by not only discussing the scientific factors at play, but the social, moral, political, and economic factors as well. The course will be conducted as a discussion-driven seminar where different points of view are encouraged. Students will be expected to read and interpret policy assessment reports and academic papers, constructively debate their peers, reach out to experts in the field, and collectively seek meaningful solutions.

CO-CURRICULAR ACTIVITIES

Athletics

As a requirement for graduation, boys are expected to take part in athletics and activities. Boys in Third, Fourth, and Fifth Forms must participate in at least two seasons of approved interscholastic sports or activities. Boys in the Sixth Form must participate in one season of interscholastic sports or the equivalent activity.

The two-sport requirement will be fulfilled if a boy:

1. Joins two interscholastic sports teams in different seasons as a player or manager. Teams may be varsity or sub-varsity level
2. Joins one interscholastic sports team as a player or manager, and participates in one of the equivalent activities listed below.

Please note that most, but not all sports, have unlimited roster space.

Interscholastic Sports

Fall	**Winter**	**Spring**
Cross-Country	Basketball	Baseball
Football	Ice Hockey	Crew
Soccer	Winter Track	Lacrosse
Water Polo	Squash	Tennis
Crew	Swimming & Diving	Track & Field
Golf	Wrestling	Ultimate Frisbee
	Crew	

Athletic Equivalent Activities

Drama Production	Notables	Debate	Haligoluk Editors
Glee Club	Orchestra	Mock Trial	Index Editors
Jazz Ensemble	Stage Crew	Model UN	Pegasus Editors
		Robotics	Game Day Crew

Music and Theater

Notables

This is the premier vocal ensemble at The Haverford School. An auditioned vocal ensemble, students sing a variety of a cappella music from around the world. Students refine the proper use of their voice, enabling them to sing music of great complexity and vocal range. The Notables perform music in a variety of musical styles, with emphasis placed on historical and stylistic performance practice techniques. Students sing in balanced voice parts, and sing music with up to eight parts. They sing in a number of languages, and memorize a substantial repertoire for performance. Additionally, elements of stage deportment, ambassadorship, and community service comprise a substantial part of ensemble study. The students rehearse extensively, and perform at school and in the larger community. The Notables are committed to providing community service through artistic performance. They perform numerous concerts each year, with the majority performed at hospitals, nursing homes, senior centers and the like. The ensemble frequently produces recordings. Students are evaluated on their level of artistry, coachability, memorization skills, and adherence to performance practices of the various styles in which they sing.

The Haverford School Jazz Ensemble

This ensemble performs a variety of contemporary, jazz-influenced arrangements for winds, brass, and percussion section. Students are auditioned and must demonstrate a satisfactory skill level to participate, as determined by the director. Students learn the skills of performing in an ensemble. They hone their technical skills and play in a variety of jazz styles. More advanced students apply their skills and knowledge to the art of improvisation. Performance venues include school functions as well as evening concerts in the winter and spring. Students must inform their advisor and the Jazz Ensemble Director of their intent for this activity to count towards their Arts graduation requirement.

The Haverford Advanced Chamber Ensembles

These are auditioned ensembles for advanced instrumental players. Students refine their musical skills by studying and performing literature from the standard chamber music repertoire. They focus on playing soloistically within a small ensemble while matching bow strokes, articulations, tone colors and interpretations. The ensembles meet one morning per week and perform throughout the school year.

Glee Club

Students learn the technical aspects of good singing, including breath control, formation of vowel shapes and vocal tone, proper diction in a variety of languages, range extension and agility. Students study repertoire from a variety of genres, from classical to folk to jazz and modern. They perform a capella music as well as music accompanied by piano and orchestra. Through their rehearsal and performances, students learn a valuable skill that can be used as a form of self expression as well as a powerful form of communication. As the music is being rehearsed daily, various compositional techniques and elements of

form are pointed out. Glee Club members participate in service learning through outreach performances. This chorus performs at 4 major concerts each year, at Haverford, in New York City, and in our community. The Glee Club joins forces with area girls' schools and with Haverford's boy choir to perform works such as Vivaldi's Gloria, Handel's Messiah, and Haydn, Mozart and Schubert Masses

Orchestra

Orchestra is an auditioned ensemble. Students must demonstrate satisfactory ability on their principal instrument to participate, as determined by the director. Students learn to phrase artistically, and develop techniques of articulation, expanded dynamic range, and stylistic interpretation through performance of a range of repertoire covering multiple styles and genres. Orchestra members develop ensemble skills such as leading, critical listening, and collaboration. In addition, students refine technical skills on their given instruments. The Orchestra performs during the annual Haverford School performances.

Stage Crew

As a member of stage crew, students have the opportunity to participate in the active creation of theatre. Working both on school productions and with professional organizations, students have hands-on experience with carpentry, lighting technology, and with scenic painting. To fulfill one sports requirement through this activity, students must complete one semester of stage crew participation. To fulfill both sports requirements, students need to participate in stage crew for the school year. However, all Haverford students must participate in the athletic program at least once before graduation.

Performance and Production Opportunities

Each year, The Haverford School Drama Department produces a minimum of two Upper School plays and/or musicals. By participating in theatrical productions either on the stage or back stage, students will become a vital part of a collaborative team. Students may count their participation in *one* of the upper school productions as *one* of their sports requirements. Students may not count participation in both productions as a fulfillment of their sports requirements for the school year.

Clubs

With more than 50 clubs and activities to choose from, our Upper School offers myriad opportunities for students to explore extracurricular activities and to develop leadership skills. All clubs are student-designed and student-led, with a faculty adviser who offers guidance and mentoring. Students and faculty are passionate about their interests – and they often extend their club commitments well beyond the boundaries of our schedule and campus.

All of our clubs and activities are active during the full School year. At the beginning of each academic year, students have the opportunity to join or start clubs based on their personal interests, and we enthusiastically encourage them to get involved. The list below is a representative, but not comprehensive, sampling of clubs and activities that have been offered in the Upper School over the past several years.

Clubs will be offered each year based on student interest.

Archery
Art Club
American Sign Language
Athletes Helping Athletes
Black Student Union
Chess & Puzzle Club
Chinese Club
Classics Club
Comedy Club
Cryptocurrency Club
Data Science and Machine Learning Club
Diversity Alliance
Econ/Stock Market Club
Engineering Club
Entrepreneurs Club
Film Analysis Club
Filmmaking Club
Fishing Club
FOCUS
Four Square Ping Pong
Geoguesser Club
GSA
Haligoluk
Haverford Interact Club
JSU
Junior States of America
Knitting Club
Lawn Games Club
Math Club
Mindfulness Club
Mock Trial
Model Congress
Model United Nations
Muslim Student Association
Pan-Asian Alliance
Newton's Notebook
Pegasus
Poetry Club
Reading Olympics
Robotics
Rock Climbing Club
SADD
Science Club
Sneakers and Stuff Club
Soft Robotics
Speech & Debate
Sports Film Study
The Index
Volleyball Club

Service Learning

The Upper School Student Service Board at Haverford is very active, with a wide variety of activities and opportunities. These events are student driven and student run and all students are invited to participate. Students who are not on the Service Board are welcome to present ideas for projects at each of our twice-monthly meetings. Some examples of service projects are as follows:

City Year Servathon is a day where volunteers renovate community centers in Philadelphia.

Special Olympics invites students to support special needs kids with a weekend of sport activities and "competitions" at this annual event held at Villanova each November.

Riverbend Environmental Center's Haunted Trails is an annual opportunity for students to help one of our environmental partners stage a fun evening of ghoulish activities for children and nature lovers.

Literacy Program supports Bryn Mawr Tutoring and goes to West Philadelphia to tutor young people.

Empty Bowls is our year-long hunger awareness education program, culminating with the Empty Bowls supper in April, which raises funds for our local hunger partners and advocates for those challenged by hunger and homelessness.

Helping Hunger Cooking Club meets several times throughout the year to prepare meals for 200 homeless people at Life Centers of Delaware County and Ronald McDonald House. Together with Agnes Irwin, students cook and later serve these meals.

Philadelphia Cares Day is a day of service involving urban renewal in the Philadelphia schools.

Environmental Work Days Throughout the year we partner with local organizations to support and promote environmental projects including: clearing bike and walking trails, cleaning up streambeds, prepping playgrounds for physically disabled, helping plant and harvest at our local CSAs, etc. in Radnor, Haverford and Lower Merion

To raise awareness and funds, boys participate along with students from Agnes Irwin and Baldwin in various walks such as: **AIDS Walk Philly**, **Juvenile Diabetes Walk**, **American Heart Walk**, **Out of the Darkness Suicide Awareness Walk, The Buddy Walk** to support kids with Down Syndrome, **Walk to Cure MS**, and several others throughout the year.

In the spring, we participate in **Race for the Cure for Breast Cancer** and the **Home Run Baseball Derby** to raise funds for **Prostate Cancer Research**. Our Lacrosse team runs the annual **Checking for Cancer Tournament** to support male cancer research.

Students also have the opportunity to lead campaigns to support those in need such as Hunger Relief, the elderly, the homeless, and a variety of other crisis situations as they occur.

Service Learning in the Classroom

Whenever possible, we seek to integrate service opportunities into the classroom and curriculum to offer students real-life context to what it is they are learning. Examples might be: students in American History class will run a voter registration project for our own students; Ceramics students build bowls to be painted and sold at our Empty Bowls Supper; Engineering students design a water collection and irrigation system to help make the Learning Garden sustainable and environmentally responsible; Spanish classes tutoring immigrant workers in our region.

These efforts put their education and knowledge into action, and are offered to students throughout all divisions at The Haverford School.

QUESTIONS

If you have any questions about the contents of this Course Catalog, please contact:

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