



Winchester Thurston School

2021 – 2022
Upper School Curriculum Overview
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Winchester Thurston School

GENERAL INFORMATION

Upper School Curriculum Overview 2021-2022

Philosophy. The Upper School is dedicated to educating students to achieve the highest academic, artistic, and athletic standards within their grasp. We are committed to educating future citizens of the world who are able to make decisions and provide leadership from a strong intellectual and ethical foundation. Each teacher in each subject strives to instill in our students a love for learning and the ability to continue learning throughout life in a world of rapid change. Therefore, we stress the ability to speak and write clearly in English, and in a world language, we study the history of peoples and nations to understand ourselves, we learn mathematics and science to understand the world and our future, we require computer instruction and use, and we concentrate on the arts to enrich our imaginations. To maintain a sound body, we provide physical education and sports in a competitive or non-competitive environment. We work toward open communication and mutual respect in all our classes.

Guidelines Upon enrolling in the Upper School.

Each year, the student will work out a full, balanced program under the direction and with the approval of the Director of Upper School and the student’s advisor and parents. Prior to course registration for junior and senior year, students are encouraged to meet with the Director of College Counseling and/or the Associate Director of College Counseling concerning course selections, as an individual’s academic program is a critical consideration in the college placement process.

The suggested course load is five major courses and one elective per trimester, plus the physical education requirement (2 trimesters each year through junior year). Year-long, core academic courses receive 6 credits, trimester electives receive 2 credits, and year long ensembles receive 3 credits in Performing Arts. Students wishing to take fewer or more than six courses must seek the approval of the Director of Upper School.

Graduation Requirements for the Classes of 2022 - 2024

English	4 Years	24 Credits
Mathematics	3 Years	18 Credits
History and Social Studies	3 Years	18 Credits
Lab Science	3 Years	18 Credits
World Languages and Cultures	Level 3	12-18 Credits (minimum of 2 years)
Computer Science	2 Trimesters	4 Credits
Performing & Visual Arts)	3 Trimesters	6 Credits*
Physical Education	3 Years	6 Credits (2 Trimesters per year)
Health	1 Trimester	2 Credits
Speech	1 Trimester	2 Credits
Additional Electives Various		24-30 Credits

*(1 in each department, 1 either department; Ensembles count toward Performing Arts credits)

140 Required Credits

Graduation Requirements for the Class of 2025

English	4 Years	24 Credits
Mathematics	3 Years	18 Credits
History and Social Studies	3 Years	18 Credits
Lab Science	3 Years	18 Credits
World Languages and Cultures	Level 3	12-18 Credits (minimum of 2 years)
Computer Science	2 Trimesters	4 Credits
Performing & Visual Arts	3 Trimesters	6 Credits*
Health, Wellness, & PE Seminar	4 Years	8 Credits (Yearly Seminar Series)
Speech	1 Trimester	2 Credits
Additional Electives		24-30 Credits

** (1 in each department, 1 either department; Ensembles count toward Performing Arts credits)

140 Required Credits

Winchester Thurston students embrace the academic opportunities presented to them; for example, a student may study more than one language or opt to take two science courses in a given year. As a result, it is not unusual for a student to graduate from WT with more than the minimum 140 credits. It should be stressed that 140 credits is a *minimum*, and full participation in the academic life of the school is expected. Moreover, in light of college expectations that students challenge themselves to the degree possible, a student who opts for minimum requirements in one area is advised to exceed the requirements in another.

Normally a student must attend WT for at least two years to be eligible for a diploma. In the rare case that a student enters in his or her senior year, the transcript will be examined to be sure he or she meets graduation requirements. For a student entering after the ninth grade, the general requirement is adjusted. Although not given credits toward a WT diploma, a student will be recognized for work done at previous schools, for purposes of placing him or her at the appropriate level and to determine specific departmental graduation requirements.

ENGLISH

Department Chair: Mr. Matthew Bachner

English 9: Literature of Journeys and Discoveries

(Required for freshmen) Year - 6 credits

What compels us to leave our comfort zones and explore the unknown? What are we willing to risk to obtain new knowledge or to ensure our freedom? How do we find our passions and our paths through life? How do we derive meaning from adversity? How can literature transport and transform us? During their freshman year, students will search for answers to these questions by engaging narratives of journeys and self-discovery—from the imaginative to the physical to the emotional. These are the stories of ancient heroes embarking on arduous quests, immigrants seeking refuge in unfamiliar lands, individuals struggling to determine who they are and the causes for which they stand. This course will serve as an introduction to the study of literature and writing at the high school level. Students will study the works of authors from a diverse range of identities, cultures, and eras and will have the agency and opportunity to explore works of their own interests.

In this course, students will:

- Learn and utilize a range of note-taking and pre-writing techniques to process and interrogate a text.
- Write in a variety of genres and forms including analysis of a single literary work, comparative analysis of multiple texts, personal essay, and creative writing.
- Approach texts with curiosity about and understanding for a character's experiences and motivations, even if vastly different from one's own.
- Develop artistic responses to a work of literature.
- Learn the fundamentals of MLA formatting, citations, and style.
- Recognize and understand the conventions of a variety of fiction and nonfiction genres and poetry.
- Sustain long periods of focused reading with complex texts in order to prepare for high school reading loads.
- Read not only for plot and detail but for complex themes, context (historical and cultural), credibility of narrator, effect of writing style, implications of the text, denotative and connotative meaning.

English 10: American Voices

(Required for sophomores) Year - 6 credits

What does it mean to be American? To what extent do Americans share a common identity? How do American authors respond to the influences of government, the natural world, race, class, and gender in their writing? How have American writers transformed what is possible with literature through innovation and experimentation with form and focus? English 10: American Voices includes a range of genres, assignments, and skills to unpack the complex cultural fabric of American identity. Students deepen skills introduced in the English 9 curriculum: analytical reading, creative and expository writing, student-centered research, and discussion. This course asks students to form arguments and challenge assumptions about American identity through written work and dialogue. Throughout the year, students will study a wide array of voices who have shaped the American literary landscape and will add their voices to this tradition as well through the writings they produce.

In this course, students will:

- Read, recognize, annotate, and understand the conventions of a variety of fiction and nonfiction genres in American Literature including novels, short stories, poetry, and essays.

- Write analytical, thesis-driven pieces that range from shorter paragraphs, such as passage analysis, to multi-paragraph comparative essays, including in-class timed assessments.
- Approach texts with curiosity about and understanding for a character's experiences and motivations, even if vastly different from one's own.
- Explore using critical lenses and secondary sources to analyze primary texts.
- Write student-centered creative assignments that ask students to adopt the voices of characters, think beyond the confines of the texts, and reflect on their own experiences.
- Participate in discussion-based classes that encourage students to ask critical thinking questions, engage in open dialogue with a variety of viewpoints that challenge their own ideas.

Song, Stage, and Screen

(Open to juniors and seniors) Year - 6 credits

The human spirit seeks to express itself by any means possible. It strives to be heard in language, image, movement, rhythm, and performance. And what does the human spirit express through these means? Rage, love, defiance--the experience of a single moment or of an entire lifetime. This course will explore the expressive forms of poetry, drama, and film and will trace the ways that these forms all work together to narrate the human experience. We will ask ourselves whether any of these forms adequately captures the nuances of a life lived. We will inquire into the powerful relationship between the form and content of language, both through observation of the text and through practice in our own writing.

Through a variety of reading and writing assignments, this course will engage both the artistic and the analytical sides of the student. Students will learn to evaluate and appreciate the aesthetic qualities of a work, even as they analyze grammar and style--including literary, poetic, and visual devices. This course will ask students to wrestle with questions of authentic expression, communication, and empathy in artistic creation and to respond on a personal and an academic level.

In this course, students will:

- Write in a variety of genres--poetry, song lyrics, drama, screenplay, and analysis--using the devices and conventions of these forms.
- Employ the skills of close reading and analysis to a range of literary and visual art forms.
- Analyze writing through critical lenses and develop arguments through these lenses.
- Effectively conceive of, plan, and time-manage long-term assignments.
- Investigate and pursue public audiences for their work beyond the classroom.
- Deliver solo presentations of substantial length and content that is focused, thorough, and engaging.
- Participate fully as a leader in class discussions.

Environmental Literature

(Open to juniors and seniors) Year - 6 credits

What is the human relationship to the natural world? In Environmental Literature, students will explore the complex and intrinsic connection between humankind and the environment. How do authors portray nature and environment? What is humankind's responsibility to our environment? How do we find the balance between dominance and coexistence? In this class, the definition of "environment" will include both our understanding of our relationship with (and place in) the natural world and our relationship to our home, neighborhood, and community.

Students will explore texts from authors as divergent as Henry David Thoreau, Ralph Waldo Emerson, and Rachel Carson to modern day writers such as Helen Macdonald, Barbara Kingsolver, Mary Oliver, and Wallace Stegner. This City as our Campus-based course will bring dynamic environmental speakers in while providing off-campus outings to places such as Frick Park, Carrie Furnace, Beechwood Farms, and Phipps

Conservatory. Writing is central to this course with an emphasis on exploring a variety of genres from creative non-fiction work to blogging to poetry.

Students will:

- Write in a variety of genres--poetry, nonfiction, analysis, and personal essay--using the devices and conventions of these forms.
- Employ the skills of close reading and analysis to a range of literary and visual art forms.
- Sustain long periods of focused reading with complex texts in order to prepare for college reading loads.
- Analyze writing through critical lenses and develop arguments through these lenses.
- Make connections between texts, across disciplines, and to personal experience.
- Participate fully as a leader in class discussions.

AP Language and Composition

(Open to juniors and seniors) Year - 6 credits

What makes an argument effective? How can the tools of language be used to convince an audience, galvanize support around an issue of importance, and inspire positive social change? This writing-intensive course, the equivalent of a first-year college English course, attempts to answer these questions through the study of rhetoric--the art of persuasion--and academic composition.

Through an exploration of nonfiction visual and literary genres--including advertising, journalism, personal essays, persuasive and argumentative essays, critical reviews, documentary film, public activism, and political discourse--students will develop critical thinking and reading skills that will help them analyze and critique the efficacy of a work. Additionally, in-class discussions and both formal and informal writing assignments will allow students to identify and experiment with a range of rhetorical devices and strategies in their efforts to produce compelling arguments.

This course culminates in participants sitting for the Advanced Placement examination, which measures their ability to analyze the rhetoric of prose passages and to compose critical arguments and research-based essays.

In this course, students will:

- Read, analyze, and develop an appreciation of several genres of literature, especially nonfiction prose.
- Employ the skills of close reading and analysis to any kind of media--political speeches, advertisements, film, websites, etc.
- Develop arguments with nuanced reasoning and supported by relevant evidence directly from texts as well as from additional research, personal experience, hypothetical scenarios, etc.
- Cultivate on-demand writing and argumentative skills.
- Evaluate and synthesize a variety of secondary sources in a sophisticated manner.
- Compose with a mastery of complex academic grammar and mechanics without significant interventions.
- Effectively conceive of, plan, and time-manage long-term papers and projects.
- Investigate and pursue public audiences for their work beyond the classroom.

AP Literature

(Open to juniors and seniors) Year - 6 credits

What makes the great works of literature great? Why do they endure? This writing-intensive course, the equivalent of a college-level introductory literature course, attempts to answer these questions by engaging students in close, critical readings of imaginative literature. The AP Literature and Composition test seeks to measure a student's ability to analyze and write about complex and sophisticated works of recognized literary merit. Through in-class discussions and both formal and informal writing assignments, students will explore the

structure and substance of various types of creative writing. Close attention is paid to a work's macro-level features, such as structure, style, and theme, and the micro-level features, the various rhetorical and poetic devices. Additionally, students will consider the social and historical context of the literary works studied.

This course culminates in students sitting for the Advanced Placement examination, which will test their ability to analyze poetry and prose fiction and to develop original literary arguments.

In this class, students will:

- Sustain long periods of focused reading with complex texts in order to prepare for college reading loads.
- Write for a variety of purposes and achieve a number of rhetorical ends through numerous styles of writing including in-class argumentative essays and multi-draft analytical essays.
- Participate fully as a leader in class discussions.
- Deliver solo presentations of substantial length and content that is focused, thorough, and engaging.

HISTORY AND SOCIAL STUDIES

Department Chair: Dr. Michael Naragon

Three years of history and social studies are required for graduation. Ninth-grade students will study Multicultural America, and tenth-grade students will take Contemporary World History or AP European History. Juniors and seniors will have several options. These courses are designed to appeal to students' wide-ranging interests and to keep pace with global trends and events.

Multicultural America

(Required for ninth grade students) Year – 6 credits

Americans in the 21st century continue to struggle over the meaning and substance of the nation's democratic ideals. In the process, they must navigate complex sets of institutionalized forms of power and privilege, which significantly shape their life chances and opportunities. This course focuses on issues of social justice and the social construction of both individual and national identities. It charts how individuals operate and dream within contexts shaped significantly by historical forces, such as race, class, gender, sexuality, and power. We will use a multicultural, interdisciplinary lens to explore the ways in which past struggles for power and rights, often rooted in identity-based conflicts, shape contemporary American political and social interactions as well as broader, global struggles.

Students will:

- Read and interpret primary and secondary source documents
- express understanding through an increasingly independent style of note-taking
- develop analytical writing skills
- work collaboratively
- Explore and articulate their personal values and think critically about the meaning of social justice and equity
- Utilize historical thinking skills (and develop historical research skills) to produce a year-end project and presentation that emphasizes understanding history from multiple perspectives

Contemporary World History

(Open to sophomores) Year – 6 credits

This course will examine and analyze important events, ideas, institutions, and developments throughout the world from the late nineteenth century to the present. Each trimester will be organized around a discrete theme. We will begin with a study of imperialism, nationalism, World War I, and the Russian Revolution. Through document analysis and persuasive essay writing, we will explore the experiences and contributions of multiple individuals and the relationships among nations in many regions of the world. From a global perspective, we will investigate World War II, genocide, and the Cold War. We will trace the development and impact of China's Communist Revolution, decolonization throughout the world, and the many forces that have shaped many regions of the world in the twentieth and 21st centuries. In addition to developing a strong command over the material, we will develop skills essential to the success of thoughtful, scholarly students. In doing so, we will expand our capacities for critical thinking and an appreciation of divergent views.

Students will:

- read, decipher, and decode primary documents and secondary sources;
- examine issues from multiple perspectives and historical points of view;
- recognize and understand the impact of historical events on contemporary politics;
- constructively engage in collaborative assignments;
- hone the skills necessary for class discussions and civil debate;
- develop, articulate, and defend original arguments;
- deepen and refine critical thinking skills

AP European History

(Open to Sophomores) Year - 6 credits

This college-level course requires the following:

- Extensive (at least one hour) nightly reading of college-level text;
- Written analysis of primary and secondary sources;
- Timed weekly essay writing;
- A willingness to devote the time required for mastery of detailed content material; and
- The development of students' academic independence.

The course serves as an intensive study of the history of Europe from 1400 to the present. From the time of the Renaissance through the collapse of communism, this class teaches the evolution of political, cultural, military, economic, philosophical, and religious ideals. Although there are certainly a lot of names, wars, and dates involved, AP European History is primarily a class about ideas. We will pursue our study of European history from a thematic approach each trimester. The first trimester will be devoted to the intellectual break with tradition from the Renaissance through the Enlightenment.

Students will discover the ideas and thoughts that influence the Long-19th century from 1789 (French Revolution) to the outbreak of World War I (1914), which will be the focus of the second trimester. Our third trimester will be devoted to responses to war, revolution, and totalitarian regimes in the 20th century. Throughout class, we will analyze primary and secondary sources, stressing the importance of their connection to the ideas and themes of history. Students will develop critical thinking and analysis skills through the use of these documents and sources. All students will prepare to take the AP European history exam in the spring. Students will practice with free-response and document-based questions taken directly from past AP exams.

Genocide -Global Perspectives on Crimes Against Humanity

(Open to juniors and seniors) Year - 6 credits

Taught as a college-level seminar, this course is designed to develop student awareness and activism centered on the issues associated with the concept of genocide and crimes against humanity in a global perspective. Students will explore historical manifestations of genocide through the lenses of not only history but of literature, sociology, economics, the development of international law, and psychology. Intellectually engaging students to think critically about the past through primary and secondary sources, students will connect themes of actors, reconciliation and remembrance, and historical memory across historical events. Utilizing the Armenian genocide, the Holocaust, the genocide in Cambodia perpetrated by the Khmer Rouge, the Rwandan genocide, the violent disintegration of Yugoslavia, and the long Guatemalan civil war and genocide of the 1980s students will study the conceptual and theoretical frameworks of historical genocides and the associated ideologies of racism, antisemitism, religious hatreds, and prejudices that preceded the violence. Together we will also promote a nuanced engagement with current events centered on crimes against humanity.

Students will:

- develop inquiry-based research and analytical skills; recognize the extent to which scholarly arguments can be used to advance, defend, and refute historical arguments
- collaborate on small group projects and presentations
- further develop their writing skills and hone their historical voice to create argument-driven essays
- critically think about primary and secondary sources, including testimonies and diaries, in order to synthesize information and to analyze those sources for deeper understanding
- utilize their historical thinking skills and understanding of history, remembrance, reconciliation, and historical memory to produce a year-end project and presentation.

Machine Learning and the Social Implications of Artificial Intelligence

(Open to juniors and seniors) Year – 6 credits

Prerequisite: successful completion of a computer science course.

Machine learning is ubiquitous today, utilized in everything from curating recommendation lists on Netflix, to diagnosing medical conditions, to detecting credit card fraud. As a result of the pervasiveness of this technology, and the desire to fully prepare our students to be fully engaged citizens, the Computer Science and History departments will offer this co-taught, full year course on Machine Learning. In this course, students will learn how to ask questions and solve problems with big-data to better understand the world from both historical and contemporary perspectives. Using critical thinking skills, students will explore and grapple with issues – such as determining authorship, understanding political affiliations, optimizing transportation systems, and analyzing the criminal justice system – that require an interdisciplinary lens to be understood best. Through this integrated class, students will learn the computer science techniques necessary to engage societal problems, they will be able to understand the historical forces that sired these issues in the first place, and they will be able to better predict the possible social and political consequences of technological change. Students who take this course can earn credit for either a computer science or history course, but not both, and must designate their choice at the time of enrollment.

Students will:

- develop and deepen their reading and historical thinking skills;
- read, synthesize, and balance competing interpretations;

- write argument-driven essays;
- determine best methods for particular machine learning task
- program in Python and learn most commonly used tools in industry/academia
- understand how to use data to build predictive machine learning models
- interpret the results and measure the effectiveness of a machine learning model
- work and collaborate constructively in project-based teams;
- apply computer science skills to solve social science problems;
- recognize the moral and ethical dimensions of technological change and the uses and limitations of machine learning;
- become engaged digital citizens;
- conduct original research that extends and deepens a course-related theme; and
- and present their findings publicly.

Urban Research and Design: Communities and Civic Engagement

(Open to juniors and seniors) Year – 6 credits

This course seeks to breach the traditional classroom walls, pushing students outside of the confines of Winchester Thurston and reducing the boundaries between the city and the school. Cities acquire their shape and function from the dynamic interaction of social, cultural, political, ecological, and economic systems. Urban design connects these various systems in order to create places and programs that elevate the human condition. Broadly conceived, urban designers fuse various disciplines—ranging from architecture to political science to environmental science—to promote the creation of communities that connect people and places, raise the quality of life, and address recognized impediments to long-term sustainability. Global trends underscore the importance of thoughtful design. By 2050, human geographers believe that 75% of the world’s population will live in urban areas, and the cities in which you will live, work, and raise families will face difficult challenges involving social inequality, housing, transportation, deteriorating infrastructure, post-industrial revitalization, environmental sustainability, crime, and food security. Throughout this course, you will be challenged to address these issues and imagine creative solutions. We will explore these issues through hands-on activities, course readings, conversations with experts and community members, and extensive fieldwork throughout the city. You will become familiar with different aspects of urban site design, and you will work individually and collaboratively to address social issues and to create two studio projects. This course envisions students directing their own learning, pursuing their intellectual interests, and making a lasting, valuable contribution to the Pittsburgh community.

Students will:

- develop and deepen their reading and historical thinking skills;
- read, synthesize, and balance competing interpretations;
- learn to read the built environment;
- work and collaborate constructively in design teams;
- create an urban design proposal tied to a specific site within the city;
- use city resources and partners to inquire and to deepen design project;
- develop, construct, and publicly present a 3-D model;
- author an extensive and collaboratively produced argument-driven essay; and
- become engaged citizens conversant in the central issues and challenges facing the city.

Power and Protest: Social Reform Movements in America since 1945

(Open to juniors and seniors) Year - 6 credits

“We cannot claim to have answers to all the complex problems of modern society. That is too much to ask of a movement still battling barbarism in Mississippi. But we can agitate the right questions by probing at the contradictions which still stand in the way of the ‘Great Society.’”

--Bayard Rustin (1965) From Protest to Politics: The Future of the Civil Rights Movement

This course examines the social movements that took up Rustin’s challenge and sought to agitate the right questions and address the complex problems of contemporary America, and it is centrally focused on struggles over the meaning of freedom and liberty. Starting with the “long civil rights movement,” the course will explore the feminist movement, the New Left, the Chicano Movement, and the LGBTQ rights movement that challenged discrimination and promoted equality, and it will trace how the New Right and the Tea Party launched and sustained conservative ideological and political responses to these movements and American liberalism. We will assess the ways in which #BlackLivesMatter and #MeToo Movement reflect earlier movements for change, and the course will conclude by investigating the global dimensions of social movements, focusing on the anti-Apartheid Movement, We Are the World, the Occupy Movement, and the Climate Change Movement.

Students will:

- develop inquiry-based research and analytical skills;
- read, synthesize, and balance competing interpretations;
- critically think about secondary and primary sources, including oral history testimonies and the built environment, in order to decipher, decode, and apply those sources to address synthesis-style questions;
- further develop their writing skills and hone their historical voice to create argument-driven essays and presentations;
- hone their media literacy skills;
- conduct original research and use city resources and partners to inquire and to deepen their long-term research project;
- utilize their historical thinking skills and understanding of public memory, remembrance, and memorialization to produce a year-end project and presentation.

American Constitutional Law

(Open to juniors and seniors) Year - 6 credits

“The First Amendment is often inconvenient. But that is beside the point. Inconvenience does not absolve the government of its obligation to tolerate speech.”

–Justice Anthony Kennedy, 1992

In this course students will seek to understand the competing values and constitutional principles lurking beneath Justice Kennedy’s call for tolerance and the proper obligations of government. The course will survey some of the great issues and controversies that surround America’s founding document. We will read U.S. Supreme Court decisions and listen to selected oral arguments seeking to understand the nature of the Constitution, the contested nature of its interpretation, and the evolving meaning of civil liberties and civil rights, such as free expression, school desegregation, voting rights, and privacy. The social and cultural context of these decisions will be particularly emphasized. Together, we will explore the following questions: What is the proper role of the Supreme Court in the political process? What is the constitutional framework for judicial review? To what extent should the Court become an agent of political change? What does it mean in practice to tolerate speech? What is cruel and unusual punishment? What is the proper balance between liberty and security? This course will emphasize critical thinking, the open exchange of ideas, and advanced essay writing skills.

Students will:

- learn to decipher and decode Supreme Court decisions;
- master the content of key cases;
- be able to place Supreme Court decisions within their proper historical contexts;
- explore the impact of Supreme Court decisions on American society and polity;
- develop the skills necessary to articulate and defend an interpretation orally;
- hone the skills necessary for class discussions and civil debate;
- write argument-driven essays; and
- engage in critical thinking about the role of law in society.

AP United States History

(Open to juniors and seniors) Year - 6 credits

This course requires the following:

- Extensive (at least one hour) nightly reading of college-level text;
- Written analysis of primary and secondary sources;
- Timed essay writing;
- A willingness to devote the time required for mastery of detailed content materials; and
- The development of students' academic independence.

This course will cover the American experience from 1400 to the present. The course will be organized thematically as well as chronologically. We will begin with the transatlantic Age of Revolution, exploring the American Revolution in a global context. The course will trace the development of the American nation and the persistent challenges to American nationalism throughout the 19th century. We will chart the origins of the Civil War and assess the radicalism of Reconstruction. Industrialization, the Progressive reform movement, the New Deal, the domestic consequences of the world wars, the Cold War, and de-industrialization will be some of the additional themes examined. Lectures, discussions, films, and primary document analysis will provide the basis for our exploration into the American past. Students will master analytical writing, oral argumentation, and critical thinking skills, and students will read secondary works penned by some of the greatest modern historians.

Students will:

- develop inquiry-based research and analytical skills;
- read, synthesize, and balance competing interpretations;
- critically think about secondary and primary sources in order to decipher, decode, and apply those sources to address DBQ-style questions;
- further develop their writing skills and hone their historical voice to create argument-driven AP essays;
- hone their AP test-taking skills;
- utilize their historical thinking skills to engage in frank, civil, and open debates over historical causation and the long-term impact and consequences of historical trends and events.

AP Macroeconomics*

(Open seniors; juniors may enroll with permission from the department chair) Year - 6 credits

Macroeconomics focuses on the economy as a whole: Major topics involve measuring economic variables related to production and prices, and developing models that explain the relationship between these variables in the short-run and long-run. Graphical analysis is used extensively throughout the year. Students in this course will work to understand the global implications of events within an economic model. Will growing nationalism undo the benefits of free trade? How pervasive (and dangerous) is income inequality? Globalization has turned

our macroeconomic model upside down in recent years, making the study of macroeconomics no longer nation specific but instead the study of a deeply interconnected world economy, in constant flux. In this course, students will be introduced to the basics of macroeconomics, exploring the scale and structure of individual economies, and the dynamics of growth. We will consider specific topics including population and migration, human capital, health care and education, and the global cost of climate change, as well as the role of political institutions in economic development. Exploring case studies based on current events, students will deepen their understanding of these fundamentals in a 21st century context. Utilizing 'City as Our Campus' partners and regional economics bodies, students will engage in project-based learning opportunities to see their economic knowledge at work in real world scenarios. This course will go beyond the AP macroeconomics curriculum to engage in the global implications of socio-economic and political trends. *(This course does not meet the graduation requirement for 3 history & social studies courses.)*

Students will:

- Develop inquiry-based research and analytical skills;
- read, synthesize, and balance competing interpretations;
- Critically think about sources of economic data, in order to decipher, decode, and apply those sources to address synthesis-style questions;
- Further develop their writing skills and hone their critical thinking to create argument-driven essays and presentations;
- Hone their media literacy skills;
- Conduct original research and use city resources and partners to inquire and to deepen their long-term research project.

**This course will only cover macroeconomic concepts and theories; it will not prepare you for the AP Microeconomics exam. Should you wish to take the AP Microeconomics exam, you will need to do extensive work outside the class.*

Modern Middle East History

(Open to juniors and seniors) Year – 6 credits

This survey course addresses the main economic, religious, political, and cultural trends in the modern Middle East. Topics to be covered include the cultural diversity of the Middle East, relations with Great Powers, the impact of imperialism, the challenge of modernity, the creation of nation states and nationalist ideologies, the discovery of oil, radical religious groups, and war and peace. Throughout the course these significant changes will be evaluated in light of their impact on the lives of a variety of individuals in the region and especially how they have grappled differently with increasing Western political and economic domination. Topics of focus will include the collapse of the Ottoman Empire during World War I, European imperialism, the rise of nationalism and Zionism, the Arab-Israeli conflict, political Islam and the role of the United States in the region. Attention will be paid to the links between the history of the modern Middle East and current events surrounding the US-led invasion of Iraq, Arab Spring, the civil war in Syria, and Iranian nuclear treaty. This course will emphasize critical thinking, the open exchange of ideas, and the production of argument-driven essays.

Students will:

- develop inquiry-based research and analytical skills; recognize the extent to which scholarly arguments can be used to advance, defend, and refute historical arguments
- collaborate on small group projects and presentations
- further develop their writing skills and hone their historical voice to create argument-driven essays
- critically think about primary and secondary sources, including testimonies and diaries, in order to synthesize information and to analyze those sources for deeper understanding
- utilize their historical thinking skills to produce a year-end project and presentation.

MATHEMATICS

Department Chair: Mr. Stephen Miller

Geometry

Year - 6 credits

Prerequisites: Successful completion of Algebra 1

In this course, students will analyze properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. Inductive reasoning is frequently used to discover new conjectures, while deductive reasoning (proofs) is also used to find new geometric relationships. Students will formulate conjectures and solve problems relating to the standard topics of Euclidean geometry. This course also includes the study of right triangle trigonometry. In addition, coordinate geometry methods will be used whenever possible, in order to emphasize the connections between algebra and geometry and to maintain students' algebra skills. While students will learn traditional geometric constructions with the use of a compass and straight edge, they will also use the dynamic mathematics modeling program GeoGebra to construct and manipulate geometric figures in order to explore their properties and relationships. This course provides students with a balance among activities emphasizing discovery, application, and proof. Students will work individually and frequently work together in small cooperative learning groups. The course assignments include: homework assignments, in class discovery activities, quizzes, tests, and occasional projects. A special unit on tessellations provides students with the opportunity to design, create, and display a set of tessellating ceramic tiles. Students should expect to spend up to an hour each night completing nightly homework exercises.

Students will:

- draw and construct geometric objects with specified properties, such as side lengths or angle measures using a variety of tools, including technology;
- classify, describe, compare, and explore properties and relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them;
- recognize and apply geometric ideas and relationships to solve problems and gain insights into other disciplines and other areas of interest outside the mathematics classroom, such as art, science, and architecture.
- create, critique and test conjectures about geometric properties and relationships and develop logical arguments to justify and establish the validity of conclusions.
- investigate conjectures and solve problems involving two and three-dimensional objects represented with Cartesian coordinates.
- understand relationships among the angles, side lengths, perimeters, areas, and volumes of congruent or similar objects;
- examine and describe the congruence, similarity, and symmetry of objects using transformations such as reflections, rotations, translations, and dilations; represent these transformations by using sketches, coordinates, vectors, and ordered pair rules;
- develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.
- use two-dimensional representations of three-dimensional objects to visualize, understand, and solve problems such as those involving surface area and volume of geometric figures, including cones, spheres, and cylinders;
- use trigonometric relationships to determine lengths and angle measures.

Algebra 2

Year - 6 credits

Prerequisite: Geometry

In this course, students will represent and analyze mathematical situations numerically, graphically, and symbolically, building on the concepts and skills developed in Algebra 1. Students will use a variety of symbolic representations to model problem situations, including both explicitly defined and recursively defined functions. In addition, students will begin to investigate and compare the properties of classes of functions and their graphs, including quadratic, higher degree polynomial, exponential, and logarithmic functions. Students will maintain and build on proficiencies developed in Algebra 1 as well as learn to solve non-linear equations involving polynomial or exponential expressions. The course emphasizes using mathematical models to represent and understand quantitative relationships and to solve problems. Graphing calculators will be used to look at the table and graphs of explicitly and recursively defined functions. Students will work individually and in small groups. The course assignments include homework assignments, investigations, partial chapter quizzes, and chapter tests. Students should anticipate spending 30-60 minutes per day on homework completion and reviewing content.

Students will:

- understand relations and functions and select, convert flexibly among, and use various representations for them;
- generalize patterns using explicitly defined and recursively defined functions;
- understand and compare the properties of classes of functions, including linear, quadratic, exponential, polynomial, and logarithmic functions;
- use and interpret a variety of symbolic representations of functions and relations;
- relate and compare different forms of representation for a given relationship;
- use graphs and numerical data to analyze the nature of changes in quantities in various types of relationships.
- understand and perform transformations such as arithmetically combining, composing, and inverting commonly used functions, using technology to perform such operations on more-complicated symbolic expressions;
- recognize, generate, and understand the meaning of equivalent forms of expressions, equations, inequalities, and systems of equations and solve them with fluency in a variety of ways—mentally, with paper and pencil, and using technology;
- use symbolic algebra to represent situations, explain mathematical relationships, and solve problems, then judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology.
- identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships, and draw reasonable conclusions about a situation being modeled.

Precalculus

Year - 6 credits

Prerequisites: Successful completion of Algebra 2

The central theme of this course is comparing, contrasting, and transforming functions in order to model change. We emphasize that functions can be grouped into families – linear, quadratic, exponential, power, polynomial, rational, and trigonometric – and that these functions can be used as models for real-world behavior. Students will use technology and analytic methods to develop a deeper conceptual understanding of the mathematical underpinnings of functional analysis. The inclusion of non-routine problems is intended to establish the idea that such problems are not only part of mathematics, but in some sense are the point of mathematics. Students taking this course should possess a willingness to work hard and be prepared to spend at least 6 hours weekly

on this course outside of class time. Students taking this course should have completed both Algebra 2 and Geometry.

Students will:

- judge the effects of such operations as multiplication, division, and computing powers and roots on the magnitudes of quantities;
- use symbolic algebra to represent and explain mathematical relationships;
- identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships;
- use trigonometric relationships to determine lengths and angle measures;
- use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations;
- understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices;

AP Calculus AB

Year - 6 credits

Prerequisite: successful completion of Precalculus.

This is a challenging college-level course, preparing students for the Calculus AB Advanced Placement exam. Applications and mathematical modeling are used to motivate topics and the graphing calculator is used extensively as a tool for investigating and applying the important concepts. Topics from the Calculus AB syllabus of the College Board's AP curriculum will be covered. These include a review of the properties and graphs of elementary functions; limits of functions; the concept of the derivative, derivatives of elementary functions, applications of derivatives; interpretation and properties of definite integrals; applications of definite integrals; and techniques and applications of anti-differentiation.

AP Calculus BC

Year - 6 credits

Prerequisite: successful completion of Calculus AB.

This course, which prepares students for the Calculus BC Advanced Placement exam, continues the study of calculus from AP Calculus AB. Applications and mathematical modeling are used to motivate topics and the graphing calculator is used extensively as a tool for conducting investigations. Topics from the Calculus BC syllabus of the College Board's AP curriculum will be covered, along with additional topics from outside the usual BC Calculus curriculum.

Statistics

Year - 6 credits

Prerequisites: Successful completion of Algebra 2

This course is designed to introduce students to the major concepts and tools for collecting, analyzing and drawing conclusions from data. The course will prepare students for life in a world filled with data, as well as for many college majors that require statistics. Students will study the fundamental ideas of statistics in a context that relates to personal experiences and needs of an informed citizen of the 21st century. Statistics helps us to understand our world: Health professionals need to understand statistics to interpret accounts of medical research; businesses use statistical methods (business analytics) to efficiently crunch numbers to support their

bottom line; and citizens need to understand statistics to accurately interpret opinion polls and the Consumer Price Index. Because data are omnipresent, everyone will find statistics useful and perhaps even profitable. In this course, students will study exploratory data analysis, learn the fundamentals of designing a study, use probability models, and use inferential statistics. Students will apply these concepts to such fields as business, biology, engineering, industry, the social sciences and many others. Students will use technology to calculate and display real data. Graphing calculators that can manipulate lists of data and contain statistical applications such as confidence intervals, tests of significance, and probability distributions will be our main technological hardware. In addition, we will be using online apps/programs. Students will work individually and frequently work together in pairs. Course assignments include: homework assignments, in class practice, computer simulations, hands on activities, quizzes and tests. Students will be invited to join us when we are visited by guest speakers. Students should expect to spend an hour or more each night completing nightly homework exercises. These assignments occasionally include watching videos or taking notes..

Students will:

- understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each
- understand the meaning of measurement data and categorical data, of univariate and bivariate data, and of the term variable, and how to analyze numerically and graphically
- recognize how linear transformations of univariate data affect shape, center, and spread
- identify trends in bivariate data and find functions that model the data or transform the data so that they can be modeled
- use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions
- understand how sample statistics reflect the values of population parameters and use sampling distributions as the basis for informal inference
- use probability theory as the foundation for inferential statistics
- understand how statistical inference is used to draw conclusions about a population or the results of an experiment and apply inferential statistics
- evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analysis, and the validity of conclusions

AP Statistics

Year - 6 credits

Prerequisite: successful completion of Algebra 2

This is a challenging college-level course that prepares students for the Advanced Placement Statistics exam. This course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes: (1) Exploring Data: Describing patterns and departures from patterns; (2) Sampling and Experimentation: Planning and conducting a study; (3) Anticipating Patterns: Exploring random phenomena using probability and simulation; and (4) Statistical Inference: Estimating population parameters and testing hypotheses. This course emphasizes statistical thinking and decision-making. Technology (TI graphing calculators and statistical software) is used extensively to foster active learning, and to carry out statistical analyses, including making graphs, finding numerical summaries, computing estimates, and testing hypotheses.

Mathematical Models for Decision Making

Year - 6 credits

Prerequisites: Successful completion of Algebra 2

In this course, students are introduced to mathematical topics necessary for decision-making in today's world. Mathematical topics are developed in the context of solving problems from business, science, and daily life. Major units of study include election theory, fair division and game theory, modeling with matrices, graphs and their applications, counting and probability, and personal finance and managing resources. Students will work individually and in small groups. The course assignments include class activities, small-scale research, homework assignments, quizzes, and unit tests. Students should anticipate spending 30 minutes per day on homework completion and reviewing content. Students should have successfully completed the Algebra 2 course before taking this class.

Students will:

- judge the reasonableness of numerical computations and their results;
- develop fluency in operations with real numbers and matrices, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases;
- generalize patterns using explicitly defined and recursively defined functions;
- understand the meaning of equivalent forms of expressions, equations, and relations;
- use symbolic algebra to represent and explain mathematical relationships;
- judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology;
- use a variety of symbolic representations, including recursive equations, for functions and relations;
- use symbolic expressions, including iterative and recursive forms, to represent relationships arising from various contexts;
- draw reasonable conclusions about a situation being modeled;
- understand matrices as a system that has some of the properties of the real-number system;
- develop an understanding of properties of, and representations for, the addition and multiplication of matrices;

Discrete Mathematics

Year - 6 credits

Prerequisite: AP Calculus BC

This course is intended for advanced mathematics students who wish to further their studies beyond calculus. In this year's version of the course, students will learn discrete mathematics, which will cover proof techniques, boolean logic, number theory, real-analysis, abstract algebra and combinatorics. Students will learn how to read and write mathematical proofs, and more deeply understand the fundamentals of mathematics through rigorous in-depth analysis. This course will prepare students for work in a variety of disciplines, including engineering, mathematics, and computer science.

Students will:

- Engage with homework and problem sets to practice the various skills discovered in class
- Demonstrate mastery of material through tests, oral presentations, and written research
- Learn to apply this exciting field of mathematics to real-world applications in fields including science, engineering, and computer science
- Learn to use the typesetting language, LaTeX, to easily type up mathematical work
- Learn to read and write mathematical proofs, a skill applicable to not only STEM disciplines but also argumentative writing and the study of law

- Present at the year-end STEM Symposium

Advanced Statistical Methods and Data Analysis

Year - 6 credits

Prerequisites: Statistics, AP Statistics, or permission of instructor (this course is offered when there is sufficient enrollment)

This course extends statistical methods learned in prior statistics classes and introduces new data analysis tools. Students will review sampling and experimental design data collection methods and statistical inference. New statistical methods include analysis of variance (ANOVA), nonparametric methods, and multiple and applied regression. Additional topics could be studied if time allows. This is a project-based course that emphasizes working with authentic data, and data analyses will be carried out using the R programming language. Students will have the opportunity to work with data sets of their choice in areas of interest to them (including, but not limited to, sports analytics, climate change, business/marketing, medicine/epidemiology, politics). Third trimester will be focused on a data analysis project of the student's choosing which could culminate in a display at the STEM Symposium in May.

Students will:

- understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each
- know the characteristics of well-designed studies, including the role of randomization in surveys and experiments
- for bivariate and multivariate measurement data, be able to display scatterplots, describe their shape, and determine and interpret regression coefficients, regression equations, and correlation coefficients using technological tools
- display and discuss bivariate data where at least one variable is categorical
- use simulations to draw conclusions about a population or an experiment when conditions for traditional inferential methods are not satisfied
- evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analysis, and the validity of conclusions
- choose appropriate statistical methods to analyze complex datasets, including analysis of variance, multiple and logistic regression, and distribution-free methods
- carry out analysis of complex datasets using appropriate statistical methods, including analysis of variance, multiple and logistic regression, and distribution-free methods

SCIENCE

Department Chair: Mr. Graig Marx

Science 9: Integrated Physics, Chemistry and Biology (IPCB)

(Required for 9th grade students) Year - 6 credits

Prerequisite: Successful completion of Algebra I, and currently enrolled in Geometry or higher.

This course provides students the foundational knowledge in physics, chemistry and biology necessary to excel in future science courses and research opportunities at Winchester Thurston. This course weaves the

connectedness of physics, chemistry, and biology to ensure 9th graders see the relevance and integration of science content areas while focusing on competencies, such as science literacy, experimental design, and problem-solving. Students in the Science 9: IPCB course will explore the properties and behaviors of matter and how those translate into both physical and biological processes. The course will have a heavy focus on hands-on learning and inquiry-based experimentation that will prepare students for future STEM courses.

Students will develop the ability to:

- Recognize and explain science principles in different situations
- Communicate scientific ideas via reports and presentations
- Use mathematics to support reasoning
- Gather and organize data
- Create and interpret graphical representations of data
- Predict outcomes from data or numerical information
- Collaborate with classmates to create unique solutions to challenges
- Design experiments using scientific equipment
- Develop lab skills specific to certain genres of science

Chemistry

(Open to Sophomores) Year - 6 credits

Prerequisites: Students entering this class must have successfully completed Science 9: IPCB and Geometry and be enrolled in Algebra 2 or higher.

This course is a math-based, chemistry course where the focus will be on understanding the concepts in chemistry through a physical and mathematical lens. This course introduces concepts such as: the structure and properties of atoms, molecules, and ions; classifying and balancing chemical reactions and associated periodic properties of the elements; chemical bonding; molecular geometry and bonding theories; gases; intermolecular forces, liquids, and solids; and properties of solutions. Teaching methods include interactive lecture, discussion, demonstration, computer simulation, laboratory work, and group work. A special emphasis will be placed on correlating concepts learned in lecture and discussion to hands-on laboratory work and the presentation of that laboratory work.

Students will develop the ability to:

- Apply concepts from Science 9 to the study of the atom and chemical reactions
- Communicate scientific ideas via laboratory reports and presentation
- Use mathematics to support scientific reasoning
- Gather and organize data
- Create and interpret graphical representations of data
- Identify patterns in quantitative and qualitative data and use the results to make predictions
- Develop a conclusion based on data analysis
- Engage in error analysis through statistical methodology
- Collaborate with classmates on group projects
- Link theoretical models to observed physical processes

AP Chemistry

(Open to juniors and seniors) Year - 6 credits

Prerequisite: successful completion of Chemistry.

AP Chemistry is designed to be the equivalent of the general chemistry course usually taken during the first college year. In order to take AP Chemistry without either introductory biology, students must test into AP Chemistry and complete a summer course or internship. It will enable students to attain a breadth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The course contributes to the development of the students' abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic. AP Chemistry provides rigorous treatment of college-level topics such as chemical behavior, bonding theory, thermodynamics, quantum theory, kinetics, equilibrium, electrochemistry, and organic chemistry. Emphasis on problem solving and extensive laboratory work prepares students for the AP examination in Chemistry.

Biology: Introduction to Cell Biology, Genetics, and Evolution

(Open to juniors and seniors) Year - 6 credits

Prerequisites: Chemistry

Biology is a laboratory-based course comprised of units relating to three major themes: cell structure and function, genetics, and evolution. We will begin with biochemistry as a way to build on prior chemistry knowledge and prepare to dive into cell structure and function. After learning cell structure and function, we will hone in on the nucleus and learn about DNA and how information is transferred throughout the cell. We then examine the roles genes play in our everyday lives and how they make us who we are. We will finish the year by studying evolution, first on a micro scale then on a macro scale. Students will be assessed through multiple methods, including short-term projects, inquiry-based labs, and written assignments.

In this course, students will:

- Apply biology content to novel situations
- Create connections between biological concepts
- Improve basic laboratory skills
- Design scientifically sound experiments
- Collect precise and accurate data
- Perform necessary calculations based on collected data
- Identify patterns in data and use results to make predictions
- Accurately represent results
- Develop conclusions based on scientific evidence
- Communicate scientific information appropriately and accurately

Biology: Introduction to the Anthropocene Era

(Open to juniors and seniors) Year - 6 credits

Prerequisites: Chemistry

We are currently living during the anthropocene era. Never before in the history of mammals has one species driven the climate of the earth. This course offers students the chance to delve deeply into our environment and the impact humans are having on it. This laboratory-based course begins by examining climate change, which sets the stage for the rest of the year. The climate change unit focuses on understanding the data available and how it shows that climate change is real and that humans are the driving cause. We then begin investigating how climate change and other human actions affect the delicate

balance of nature. We will continue to explore different ecosystems, the importance of biodiversity, and how we rely on nature. Throughout the course, students will engage in a year-long, CAOC project that will focus on improving the environmental health of our community. Students will be required to present their work throughout the year and at the STEM symposium.

In this course, students will:

- Apply biology content to environmental situations
- Connect human actions to environmental outcomes
- Create connections between biological content
- Improve basic laboratory skills
- Design scientifically sound experiments
- Collect precise and accurate data
- Perform necessary calculations based on collected data
- Identify patterns in data and use results to make predictions
- Accurately represent results
- Develop conclusions based on scientific evidence
- Communicate scientific information appropriately and accurately

Altruistic Engineering and Design 1

(Open to juniors and seniors) Year - 6 credits

Prerequisite: Sophomores and juniors must also be concurrently enrolled in a core lab science (i.e. Chemistry, Environmental Biology).

Recommended: Prior computer science courses (i.e., Physical Computing).

The Altruistic Engineering and Design course offers students a distinct learning opportunity by emphasizing the application of research through integrated projects that utilize the engineering cycle for prototype development. In this course students apply our credo, "Think also of the comfort and the rights of others" by designing products and processes that can improve the lives of individuals and communities, both locally and globally. In consultation with the course instructor, students will work in small groups on all projects. This student-centered course is structured to highlight the creativity and design aspects associated with STEM learning. There will be a heavy focus on CAD modeling and 3D-printing for rapid prototyping. Integrating electrical circuits, sensors, and/or microcontrollers is an option for those with experience. Each student-design team will work with mentors with relevant expertise from academia and/or industry through WT's City as Our Campus program. Students will be responsible for sharing their products with members of the broader scientific community through local symposia, print media, or other suitable modes of communication. Students will be encouraged to consider participating in possible regional, state, and national STEM competitions, when appropriate.

Students will develop the ability to:

- Utilize research to synthesize original solutions to problems
- Evaluate the impact of existing problems in the local community, nationally, and/or globally
- Apply the design/engineering process
- Persevere through failed iterations

- Seek and interpret feedback gathered through user and expert interviews
- Develop proper experimentation methods needed to analyze a prototype
- Identify patterns in data and use results to make predictions
- Make data driven decisions
- Properly communicate design goals, fabrication process, prototype limitations and potential impact to a variety of audiences.

Altruistic Engineering and Design 2

(Open to juniors and seniors) Year - 6 credits

Prerequisite: Successful completion of Altruistic Engineering and Design 1

Altruistic Engineering and Design 2 course offers students who completed Research Science 1 the opportunity to continue to build on their project from Research Science 1, going deeper or further refining their design, or to engage in a new project. As with Altruistic Engineering and Design 1, students engage in a distinct learning opportunity by emphasizing the application of research through integrated projects that utilize the engineering cycle for prototype development. In this course students apply our credo, "Think also of the comfort and the rights of others" by designing products and processes that can improve the lives of individuals and communities, both locally and globally. In consultation with the course instructor, students will work in small groups on all projects. This student-centered course is structured to highlight the creativity and design aspects associated with STEM learning. There will be a heavy focus on CAD modeling and 3D-printing for rapid prototyping. Integrating electrical circuits, sensors, and/or microcontrollers is an option for those with experience. Each student-design team will work with mentors with relevant expertise from academia and/or industry through WT's City as Our Campus program. Students will be responsible for sharing their products with members of the broader scientific community through local symposia, print media, or other suitable modes of communication. Students will be encouraged to consider participating in possible regional, state, and national STEM competitions, when appropriate.

Students will develop the ability to:

- Utilize research to synthesize original solutions to problems
- Evaluate the impact of existing problems in the local community, nationally, and/or globally
- Apply the design/engineering process
- Persevere through failed iterations
- Seek and interpret feedback gathered through user and expert interviews
- Develop proper experimentation methods needed to analyze a prototype
- Identify patterns in data and use results to make predictions
- Make data driven decisions
- Properly communicate design goals, fabrication process, prototype limitations and potential impact to a variety of audiences.

Astronomy

(Open to juniors and seniors) Year - 6 credits

Prerequisite: Successful completion of Science 9: IPCB and Chemistry.

This course is similar to an introductory, college-level astronomy course where students use their basic knowledge of physics and chemistry to discern information about the distant celestial objects in the solar

system and universe. The course will cover a wide range of topics from the basic techniques of naked-eye astronomy, stellar evolution, and galactic astronomy to the amazing technological methods that are used by modern astronomers and astrophysicists. In addition to studying the content in the OpenStax textbook, students will dive deep with in-class labs to sharpen their data analysis skills. Students will complete a final major project of their own design, choosing from a wide range of possible topics, from launching a satellite to analyzing spectral data from planets and stars.

Students will develop the ability to:

- Apply physics and chemistry to the study of astronomy
- Communicate scientific ideas via presentations and projects
- Use mathematics and data analysis to support scientific reasoning
- Gather and organize data
- Create and interpret graphical representations of data
- Predict outcomes from data or numerical information
- Collaborate with classmates on group projects

AP Physics C: Mechanics and Electricity and Magnetism and Mechanics

(Open to sophomores, juniors and seniors) Year - 6 credits

Prerequisite: successful completion of Science 9: IPCB; successful completion of AP Calculus AB.

AP Physics C is modeled after two college semesters of calculus-based, introductory physics and follows the content outlined in the College Board's Advanced Placement Physics C syllabus. It is intended for students who have a rigorous command of algebra and trigonometry and are planning to major in a physical science or engineering. The course is equally divided into two major topics: Mechanics (first half) and Electricity and Magnetism (second half). This class will employ a range of teaching techniques, including a flipped classroom format whereby students view instructional information before class and then use class time to ask questions, expand on concepts, and apply their knowledge and skills to complete complex labs and projects. All students will engage in an experience that involves in-depth labs and projects that showcase physics in practical situations, while budding theoretical physicists will be able to apply their mathematical prowess to the most difficult types of problems.

Juniors will be required to take at least one of the AP exams (Mechanics, or Electricity and Magnetism).

Students will develop the ability to:

- Communicate scientific ideas in oral and written forms
- Use mathematics to support scientific reasoning
- Gather and organize data
- Create and interpret graphical representations of data
- Identify patterns in quantitative and qualitative data and use the results to make predictions
- Develop conclusions based on data analysis
- Collaborate with classmates on group projects
- Link theoretical models to experimental setups
- Represent and analyze situations with diagrams and mathematical models
- Develop solutions to problems using physics principles

AP Biology

(Open to juniors and seniors) Year - 6 credits

Prerequisites: Successful completion of biology and chemistry.

This course relies heavily on knowledge gained in the introductory biology courses. In order to take AP Biology without either introductory biology, students must test into AP Biology and complete a summer course or internship. AP Biology is a laboratory-based course that builds on the knowledge and skills addressed in the General Biology and Chemistry courses. AP Biology includes topics regularly covered in a two-semester college introductory biology course and differs significantly from the General Biology course with regard to the type of textbook used, breadth and depth of topics covered, investigative and skills-based nature of laboratory investigations, and time and effort required on the part of the student. AP Biology provides students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. The thematic units covered relate to the overarching big ideas and enduring understandings contained within the College Board Curriculum Framework for Advanced Placement Biology. Major topics of discussion will include evolution, energy transfer, continuity and change, relationship between structure and function, homeostatic control, interdependence in nature, and the role of biotechnology in society. Students are required to complete reading assignments from the textbook and primary literature sources. These resources will be used to relate concepts learned in class to matters on a global scale.

Students will develop the ability to:

- Connect biology content to concepts learned in chemistry and physics
- Make deeper connections between multiple biological systems
- Build on basic laboratory skills to perform research-based experiments
- Design open-ended, inquiry-based experiments with appropriate controls
- Collect and present precise and accurate data
- Create and interpret graphical representations of data
- Identify patterns in quantitative and qualitative data and use the results to make predictions
- Develop conclusions based on scientific evidence
- Communicate scientific information appropriately and accurately through laboratory reports, posters and presentations

Experimental Psychology

(Open to seniors; juniors will be considered if the class does not fill) Year - 6 credits

Prerequisites: Any listed Biology class (may be taken concurrently.)

Recommended: B or higher in previous science and humanities courses.

In this Experimental Psychology course we will focus on the scientific investigation of basic psychological processes such as learning, memory, sensation/perception, motivation, emotion, development and cognition in humans and animals. We will examine the latest advances in brain science and findings from behavioral studies in both animals and humans to gain a deeper understanding of cognition and how it develops over the lifespan. We will begin by exploring the biological basis of mental processes through the study of neurons and the nervous system, leading to a study of how the brain is organized.

How our emotions and motivations tie together our brain and body will also be discussed. The mechanism for translating sensory input into perceptual experience will also logically come out of our study of brain structure

and organization. We will then move on to investigate how we learn and process new information, and how that information is stored in our brains to create memory. We will also examine how our brains and thought processes develop from prenatal stage through advanced age. Interwoven throughout the course will be an analysis of the major historical and current scientific theories that have emerged from behavioral research and cognitive modelling and AI. Student-directed laboratory investigations will be a major part of this course, with the goal of partnering with CAOC mentors and producing authentic research to present at the STEM symposium.

NOTE: This course does not meet the WT graduation requirement for science. Although it covers some of the material addressed in the AP Psychology course, students will need to do significant work outside of the class to prepare for the AP exam.

- Make connections between biology, neuroscience, and psychology concepts relating to the way the human brain processes information
- Communicate scientific ideas through discussions, presentations, and papers
- Interpret statistical meaning and interpretations of data
- Understand differences between correlational and experimental data
- Interpret and analyze research methods and results from both in-class, laboratory experiments and scientific papers
- Gain experience in reading and interpreting scientific data from primary and secondary literature sources
- Link theoretical models to observed behavior and mental processes
- Design and conduct an independent research study

Biotechnology

(Open to juniors and seniors) Year - 6 credits

Prerequisites: Biology and Chemistry

Biotechnology is an advanced laboratory course that builds on students' prior knowledge from our biology and chemistry courses. Students will develop rigorous and advanced-level research techniques, such as DNA cloning, CRISPR, cell culture, cell transformation, DNA barcoding, ELISA assay, and western blotting and apply them to investigate topics in biochemistry, molecular biology, microbiology, and immunology. In addition, students will analyze and debate arguments around the ethics of how technologies such as stem cell research, cloning, use of personal genetic information, gene editing, and genetic testing are used in today's society. They will further develop their scientific communication skills through writing, presentations, and graphic design. Assessments will include mock scientific journal submissions, presentations to an authentic audience outside of the classroom, and quality of research. The class will cumulate with students designing and conducting their own authentic research to present and defend at the STEM symposium. Students will also be encouraged to apply to the Pittsburgh Regional Science and Engineering Fair and submit their work to Sigma.

Students will be able to:

- Construct arguments based on science and facts
- Apply previous knowledge to new situations
- Design authentic research protocols
- Collect precise and accurate data from various scientific techniques
- Perform calculations for experimental design and data analysis
- Identify patterns in data analysis and use the results to make predictions
- Develop a conclusion based on data analysis

WORLD LANGUAGES AND CULTURES

Department Chair: Ms. Lea Ekeberg

Chinese 1

Year - 6 credits

Prerequisites: None

This introductory language course immerses students in simple, comprehensible interactions in Chinese. The teacher and students together create conversations and stories that are interesting, relevant, and memorable. Priority is given to high-frequency, high-interest vocabulary and structures that give students the power to express themselves in Chinese. A variety of games and activities are used in class to reinforce and consolidate students' grasp of the language. Over the course of the year, students learn to narrate events, describe people and things, and share their opinions. Students learn to read and write simplified characters and are able to write short stories and essays by hand by the end of the year.

Chinese 2

Year - 6 credits

Prerequisites: Successful completion of Chinese 1.

In this course, students learn to express their experiences and opinions about their daily lives, including topics such as home and family, school, sports, arts, clothing, food, technology, and transportation. At the same time, they also explore the daily life of students in Chinese-speaking countries, comparing and contrasting in ways that shed light both on Chinese culture and their own. Emphasis is placed on high-frequency vocabulary and structures that empower students to describe, narrate, compare and explain in greater detail in writing and speech.

Chinese 3

Year - 6 credits

Prerequisites: Successful completion of Chinese 2.

In this intermediate course, students explore the geography of the Chinese-speaking world, delving into topics such as climate, cuisine, housing, and travel. They investigate regional differences and begin to situate their evolving cultural knowledge into a geographical framework. Videos, films, images, podcasts and songs help bring the culture to life, and a Chinese novella provides extensive reading practice. Students use the language to draw connections, compare and contrast, and express and support their opinions with increasing precision. They complete small research projects on living and traveling in various locations in China and present their findings in a variety of creative formats.

Tradition and Transformation in China

Year - 6 credits

Prerequisites: Successful completion of Chinese 3.

In this high-intermediate course, students explore the stories that have shaped the Chinese worldview over thousands of years. From origin myths to philosophical allegories, romantic legends to battle sagas, martial arts epics to propaganda campaigns, tales of emperors and tales of commoners, well-known tales in text, audio, and film formats are used as entryways to important moments and concepts in Chinese history. Students increase their language proficiency as they develop their cultural and historical knowledge. They demonstrate their understanding by analyzing the stories for the perspectives and values they promote, and comparing and contrasting them with stories from other places and times. Student work takes the form of class discussions and debates, creative and analytical writing tasks, and research projects presented in multimedia formats.

Advanced Seminar in Chinese Culture and Society - 1

Year - 6 credits

Prerequisites: Successful completion of Tradition and Transformation in China

In this advanced course, students investigate various facets of Chinese culture and society past and present. Pedagogical materials, authentic online resources, podcasts, and films illuminate cultural topics and serve as a basis for discussion and analysis. As they deepen their understanding of Chinese culture and society, students continue to hone their listening and reading comprehension skills, expand their vocabulary, and strengthen their grasp of grammatical structures, allowing them to communicate in Chinese in greater depth and with growing precision. Students undertake independent reading and extended research projects using Chinese language sources and create multimedia presentations to share their findings with the class.

French 1

Year - 6 credits

Students will be immersed in simple, comprehensible conversations and stories that will allow them to begin to talk about themselves and their daily lives in French. Priority is given to high-frequency vocabulary and structures that will enable students to discuss common interests and events. Emphasis is placed on listening and reading comprehension with the understanding that students will develop accuracy in speaking and writing over time. Over the course of the year, students learn to narrate events, describe people and things, and express their opinions as they learn about people, places, products, and practices around the francophone world.

French 2

Year - 6 credits

Prerequisite: Successful completion of French 1

In this course, students will expand their ability to communicate in French about topics such as school, hobbies, health, hometowns, food, childhood, and travel. They will compare and contrast facets of daily life throughout the francophone world, brought to life through images, videos, blogs, news reports, novellas, art, music, and film. Emphasis is placed on high-frequency vocabulary and structures that increase students' abilities to

describe, narrate, compare and explain in writing and speech. Students are introduced to popular francophone singers, a free reading program, and online exchanges with francophone peers to encourage their engagement with francophone cultures outside of the classroom.

French 3

Year - 6 credits

Prerequisite: Successful completion of French 2.

In this intermediate course, students explore topics in both francophone and American cultures and societies. Students articulate their own identities through discussions of childhood memories, future plans, and hypothetical situations. Novellas, films, and graphic novels from the francophone world bring diverse characters, locales and time periods into the classroom and serve as the basis for class discussions, writing assignments, presentations, and projects. Students expand their ability to use French to draw connections, make comparisons, and express and support their opinions with an increasing range of verb tenses and moods. Continued exposure to popular francophone singers, current events, a free reading program, and online exchanges with francophone peers encourages engagement with francophone cultures outside of the classroom.

The Francophone World

Year - 6 credits

Prerequisite: Successful completion of French 3.

In this class students will explore the diverse perspectives, experiences, and identities in the contemporary francophone world through compelling narratives in film, short stories, graphic novels, songs, and news reports. Students develop their language proficiency as they deepen their cultural understanding of the francophone world. Units are developed around cultural topics of interest to the students, and the class follows and discusses current events throughout the year. Students demonstrate their growing competence through creative and analytical writing, class discussions and debates, research projects, and multimedia presentations.

Advanced Seminar in French 1

Year - 6 credits

Prerequisite: Successful completion of Exploring the Francophone World or AP French Language and Culture

Students study key issues in the contemporary francophone world through videos, news reports, literature, films, podcasts, and songs. Themes center around contemporary social issues, such as immigration, identity, politics, the environment, and health. Students gain a deeper understanding of a variety of global challenges, as well as the specific ways they play out in various francophone countries. They demonstrate their understanding by engaging in class discussions and debates, writing analytical and persuasive essays, and presenting their research to their classmates. In addition, students undertake individual or small-group research projects in order to hone their communicative skills while pursuing personal interests.

AP French Language and Culture

Prerequisite: Successful completion of Exploring the Francophone World

Students study key issues in the contemporary francophone world through videos, news reports, literature, films, podcasts, and songs. Themes center around contemporary social issues, such as immigration, identity, politics, the environment, and health. Students gain a deeper understanding of a variety of global challenges, as well as the specific ways they play out in various francophone countries. They demonstrate their understanding by engaging in class discussions and debates, writing analytical and persuasive essays, and presenting their research to their classmates. Throughout the course, students will polish their communication skills in preparation for the AP exam and continued study at the college level.

Latin 1

Year - 6 credits

This course introduces the student to the basics of the Latin language and to life as it was lived in diverse areas of the Roman Empire. The focus is on reading Latin rather than simply memorizing endings, and so students begin reading extended passages of Latin at the outset. As their skill develops, the passages become longer and more challenging. Their developing skills in reading Latin will include grammar, vocabulary, and syntax. Through their readings they will become acquainted with life in Roman Italy, the agrarian and turbulent province of Britain, and cosmopolitan Alexandria, Egypt.

Latin 2

Year - 6 credits

Prerequisite: Successful completion of Latin 1

Students will continue to build on the work they did in Latin 1, to enhance their ability to read more complex passages of Latin. They will learn new vocabulary and syntax necessary for that task. Students will be introduced to the literary style of Classical Latin literature. The passages they read will broaden their knowledge of life and culture in Imperial Rome by learning about the organization of the Roman army, life in the court of the Emperor Domitian, and the siege of Masada and its aftermath.

Latin 3

Year - 6 credits

Prerequisite: Successful completion of Latin 2.

In this course, students will complete their study of the main features of Latin syntax and inflectional forms. The first six chapters of their book form the end of the “novel” that students began reading at the beginning of Latin 1. Students will subsequently read un-adapted passages from authors such as Pliny, Cicero, Ovid, Horace, Catullus, Sallust, and Vergil.

Reading Latin Literature

Year - 6 credits

Prerequisite: Successful completion of Latin 3.

The texts for this course are selected in consultation with those students of Latin 3 who intend to pursue a fourth year of study in the language. Half of the course is devoted to poetry, and half to prose. Poetry may include selections from Vergil, Ovid, Catullus, Horace, Lucretius, or Terence. Prose selections may include Livy, Cicero, Caesar, Curtius, or Petronius. Grammar and inflectional forms are reviewed and exercised regularly.

Advanced Seminar in Latin

Year - 6 credits

Prerequisite: Successful completion of Reading Latin Literature.

This course provides a student the opportunity to read challenging and substantial passages of Latin that are not covered in previous Latin courses. In this course students will consult secondary literature on the selected author(s) and, because much of the focus is on the legacy of Classical culture in general and Latin literature in particular, they may also be expected to read literature from beyond the Classical period.

Spanish 1

Year - 6 credits

Spanish 1 is a course designed to introduce the student to grammar, reading, writing, and listening skills. Cultural information is provided and taught throughout the course. Emphasis is placed on conversation, vocabulary and correct usage of the language. This requires a daily emphasis on listening and speaking while developing the ability to write and understand basic Spanish paragraphs or dialogue on a familiar topic in order to function in everyday situations.

Spanish 2

Year - 6 credits

Prerequisite: successful completion of Spanish 1.

Spanish 2 builds on the fundamental language elements taught in Spanish 1 and continues to focus on the four language skills, which are reading, writing, speaking, and listening in the target language. Through this course, students expand their knowledge of Spanish grammatical structures and vocabulary allowing them to freely communicate ideas using various tenses.

Spanish 3

Year - 6 credits

Prerequisite: Successful completion of Spanish 2.

Students will learn to support opinions with more spontaneity and accuracy, and to describe and narrate using broader vocabulary and more complex sentence structures on familiar topics, both in written and oral forms.

They will be able to create and combine new material with greater ease and understand conversations and texts on cultural topics from authentic sources.

The Culture and Literature of the Spanish-Speaking World

Year - 6 credits

Prerequisite: Successful completion of Spanish 3.

This class is designed to give students a high level of cultural competence of the cultures of Spanish-speaking peoples. Students will read a wide variety of texts, including textbooks, poetry, essays, short stories, and at least one novella and one full play. Students will gain cultural content knowledge through reading class materials and completing research using contemporary sources such as online documents, movies, music, paintings, sculptures, architecture, magazines, journals and newspapers. In order to continue developing their communication skills, students will compose short and long critical and expository essays, create examples of creative nonfiction writing, write at least one long research paper, and deliver several in-class presentations. Students will finish the class by presenting their research on a topic of contemporary importance, centered in a culture of the Spanish-speaking world. This course will cover grammar only as needed by individual students in the class.

AP Spanish Language and Culture

Year - 6 credits

Prerequisite: Successful completion of The Cultural History of the Spanish-Speaking World.

Students will polish and master their linguistics skills in preparation for the AP examination. An increased amount of authentic materials in the target language, such as newscasts, movies, newspapers, and magazines, will be used to help students practice listening, reading, and speaking skills. Students are trained to converse freely and write about everyday, abstract, and hypothetical topics.

Advanced Seminar in Contemporary Hispanic Cultures

Year - 6 credits

Prerequisite: Successful completion of The Cultural History of the Spanish-Speaking World or AP Spanish Language and Culture.

This class is designed for students with a strong interest in the contemporary cultures of the Spanish-speaking world. By “culture” we mean the totality of the human experience, from which we will choose our focus according to students’ interests and important current events. Hence, we may cover subjects such as: visual and performing arts, literature, politics, economics, the sciences, philosophy, and sports. Students will choose a specific social issue to research, study, and present through the year. Some social issues may be: access to water, food, or housing, child poverty, national education or health, international relations of Spanish-speaking countries, the environment, urbanization and its challenges, ethnic, gender, or economic minorities, or any subject of interest to the student.

Students are expected to present their research results publicly at the end of the academic year. The presentation format could take the form of a video produced by the student, a public oral presentation in a TED Talk format, or another format approved by the instructor.

COMPUTER SCIENCE

Department Chair: Mr. David Nassar

Computer Science for the Humanities

(Open to all grades) Trimester – 2 credits

In this trimester course, students will practice problem-solving skills by creating computer programs that focus on applications to the study of history and language. Through projects including population simulations, word games, and social interaction models, students will dive headfirst into computer science while preparing themselves to utilize technology to understand the humanities better and share this understanding with others. Students will use Python and Processing as their primary language to complete four different projects. Students will be assessed through both project work and formal quizzes. The skills learned in this course will prepare students for more advanced computer science courses and will be widely applicable to further pursuits in other disciplines.

Students will:

- utilize an API to troubleshoot and design code;
- learn introductory Python and Processing syntax;
- use debugging techniques to solve problems in their code;
- use variables to create efficient and adaptable code;
- use control statements such as conditionals and loops;
- organize code for efficiency, readability, and reusability;
- develop algorithms to solve problems.

Computer Science for Mathematics and Science

(Open to all grades) Trimester – 2 credits

In this trimester course, students will practice problem-solving skills by creating computer programs that focus on applications to the study of mathematics and science. Through various projects, including animal mimicry, healthcare applications, fractals, and science simulations, students will immerse themselves in computer science while preparing themselves to utilize technology to understand mathematics and science better and share this understanding with others. Students will use both Python and Processing as their primary languages to complete four major projects. Students will have both project work and formal quizzes. The skills learned in this course will prepare students for Level Two computer science courses and will be widely applicable to further pursuits in other disciplines.

Students will:

- understand how to abstract a problem using computational thinking techniques;
- utilize an API to troubleshoot and design code;

- learn introductory Python and Processing syntax;
- use debugging techniques to solve problems in their code;
- use variables to create efficient and adaptable code;
- use control statements such as conditionals and loops;
- organize code for efficiency, readability, and reusability;
- and develop algorithms to solve problems.

Computer Science for Art and Music

(Open to all grades) Trimester – 2 credits

In this trimester course, students will practice problem-solving skills by creating computer programs that focus on applications to the study of art and music. Through projects on game animation, user-interface design, electronic instruments, and autonomous art generation, students will immerse themselves into computer science while preparing themselves to utilize technology to understand the arts better and share this understanding with others. Students will use Processing as their primary language to complete four different projects. Students are assessed through both project work and formal quizzes. The skills learned in this course will prepare students for more advanced computer science courses and will be widely applicable to further pursuits in other disciplines.

Students will:

- utilize an API to troubleshoot and design code;
- learn introductory Python syntax;
- use debugging techniques to solve problems in their code;
- use variables to create efficient and adaptable code;
- use control statements such as conditionals and loops;
- organize code for efficiency, readability, and reusability;
- develop algorithms to solve problems.

Interactive Storytelling and Video Game Design

(Open to all grades) Year - 6 credits (4 Credits in CS, 2 Credits in Performing or Visual Arts)

In this year-long interdisciplinary course, students use computer science fundamentals and the humanities and arts to design their own interactive game, simulation, or story. Students will use Unity and C# to code a world of their own and tell a unique story filled with personal characters and rich locations. By researching game design evolution, studying storytelling mechanisms, and understanding design paradigms, students will create a unique collection of games and virtual simulations for other students to enjoy. Art and music instruction will add functionality to the student-designed game. Through collaboration with other departments and City as Our Campus partnerships, students will become familiar with game design's cross-curricular applications. Students are assessed through project work using the Agile Design Methodology. The skills learned in this course will prepare students for additional computer science courses and will be widely applicable to further pursuits in other disciplines.

Students will:

- learn the foundational skills in Unity by creating self-contained game examples;
- learn to use the work-flow methodology of Agile Design;
- develop a unique framework for their game concept;
- study a variety of gameplay and storytelling mechanisms;

- code a basic overview of their video game or world simulation in Unity;
- add the functionality of art and music to their game with instruction from art and music teachers;
- design storyboards, character art, splash pages, and box art;
- design and record sound effects and musical additions
- receive play-test feedback from other students to make changes and evolve their game;
- and present their games at a year-end event.

Physical Computing

(Open to all grades) Trimester – 2 credits

Prerequisite: Successful completion of CS for the Arts and Humanities, CS for Mathematics and Science, or Interactive Storytelling and Video Game Design.

This computer science elective provides students interested in robotics, engineering, and mobile application design an opportunity to explore these topics. Students will research and design a solution to solve challenges, learn to control existing manufactured electronics with computers, and utilize sensors on mobile phones to create simple applications. After the design process, students will build a physical prototype to test. Using Arduinos, Wi-Fi-enabled microcontrollers, mobile phones, and various newly developed motion sensors, students will explore how to utilize technology to control elements in the physical world. The skills learned in this course will prepare students for additional computer science courses and will be widely applicable to further pursuits in other disciplines.

Students will:

- further competencies learned in a level one course;
- utilize arrays and other data structures;
- learn Arduino syntax and hardware;
- acquire Electrical engineering fundamentals;
- learn Raspberry Pi syntax and hardware;
- and create Internet-connected devices and simple web applications.

Machine Learning and the Social Implications of Artificial Intelligence

(Open to juniors and seniors) Year – 6 credits

Prerequisite: Successful completion of CS for Humanities, CS for Mathematics and Science, CS for Art and Music, Interactive Storytelling and Video Game Design, or any other year-long CS offering.

Machine learning is ubiquitous today, utilized in everything from curating recommendation lists on Netflix to diagnosing medical conditions to detecting credit card fraud. As a result of the pervasiveness of this technology, and the desire to prepare our students to be fully engaged citizens, the Computer Science and History departments will offer this co-taught, full year course on Machine Learning. In this course, students will learn how to ask questions and solve problems with big-data to better understand the world from both historical and contemporary perspectives. Using critical thinking skills, students will explore and grapple with issues--such as determining authorship, understanding political affiliations, optimizing transportation systems, and analyzing the criminal justice system--that require an interdisciplinary lens to be understood best. Through this integrated class, students will learn the computer science techniques necessary to engage societal problems, they will be able to understand the historical forces that sired these issues in the first place, and they will be able to better predict the possible social and political consequences of technological change. Students who take this course

can earn credit for either a computer science or history course, but not both, and must designate their choice at the time of enrollment.

Students will:

- develop and deepen their reading and historical thinking skills;
- read, synthesize, and balance competing interpretations;
- write argument-driven essays;
- determine best methods for particular machine learning task
- program in Python and learn most commonly used tools in industry/academia
- understand how to use data to build predictive machine learning models
- interpret the results and measure the effectiveness of a machine learning model
- work and collaborate constructively in project-based teams;
- apply computer science skills to solve social science problems;
- recognize the moral and ethical dimensions of technological change and the uses and limitations of machine learning;
- become engaged digital citizens;
- conduct original research that extends and deepens a course-related theme;
- present their research findings publicly.

AP Computer Science A

(Open to sophomores, juniors, and seniors) Year – 6 credits

Prerequisite: Successful completion of CS for Humanities, CS for Mathematics and Science, CS for Art and Music course, or Interactive Storytelling and Video Game Design.

This course further introduces students to object-oriented programming to solve and advance students' knowledge of computer science as a complete academic discipline. Students will learn the intricacies of the Java language while covering topics required for the AP Computer Science A exam. Students will spend much of the year coding labs to solidify these concepts. AP Computer Science will help prepare them for Algorithm Design, Entrepreneurship and Product Design, and a college track of technical studies in engineering and computer science.

Students will:

- further develop competencies learned in a level one course
- acquire introductory and advanced Java syntax
- Develop programming skills in the Object-Oriented paradigm
- Develop and apply troubleshooting and debugging techniques
- input and output methods, such as reading and writing external data files
- Understand and implement control statements such as conditionals and loops
- Utilize data structures including One- and Two- Dimensional Arrays and ArrayLists
- apply more advanced algorithms including recursive functions, searching and sorting
- organize and write code for efficiency, readability, and reusability

Entrepreneurship and Product Design 1

(Open to sophomores, juniors and seniors) Year – 6 credits

Prerequisite: Successful completion of CS for Humanities, CS for Mathematics and Science, CS for Art and Music course, or Interactive Storytelling and Video Game Design.

In this entrepreneurial course, students will be involved in full-scale research projects to solve real-world problems using computer science. They will model the approach computer science teams use to complete full-scale projects and utilize agile software development methodology. In this practicum-based course, students will work through each step of a project; research to design to implementation. Through the City as Our Campus program, each student is paired with an expert community mentor who helps students refine their project ideas and provide valuable feedback throughout students' product development. Students will develop full sales pitches and create short commercials to promote their products through collaboration with our English Department and City as our Campus partners. Upon completion, students will produce a research paper summarizing their project's development and orally present their research efforts at a year-end STEM Symposium.

Students must submit a proposal to be approved by the teacher to be admitted into this class. Proposals for research projects can be student-generated or instructor-guided ideas. Proposals are considered by both the class instructor and the City as Our Campus staff.

Students will:

- research and develop a novel product design that meets user needs;
- study how patents, trademarks, trade secrets and copyrights can be used to protect intellectual property and apply to their own unique projects;
- communicate with a professional mentor in their product field to refine product design;
- create a working timeline for project completion using the Agile Development Methodology;
- work collaboratively or individually to create their product;
- play-test products to engage in iterative design process and ensure product meets user needs;
- develop a sales pitch and short commercial for the product through collaboration with the English department and City as our Campus partnerships;
- develop project budgets and consider revenue streams;
- write research articles explaining their product design;
- and present their completed projects at the year-end STEM Symposium.

Entrepreneurship and Product Design 2

(Open to juniors and seniors) Year – 6 credits

Prerequisite: Successful completion of Entrepreneurship and Product Design 1.

Entrepreneurship and Product Design 2 is designed for students who wish to deepen and hone the skills acquired in Entrepreneurship and Product Design 1. As with Entrepreneurship and Product Design 1, students will be involved in full-scale research projects to solve real-world problems using computer science. Students will have the option of further developing and refining their previous project or of developing a new project. Students must submit a proposal to be approved by the teacher to be admitted into this class.

Students will:

- further competencies acquired in Entrepreneurship and Product Design 1.

Algorithm Design

Year – 6 credits

Prerequisite: Successful completion of AP Computer Science or successful completion of an entrance assessment.

In this capstone course, students will more fully develop their computational problem-solving skills in order to abstract complex problems. With a focus on algorithm design and best software-engineering practices, students will be presented with weekly/biweekly challenges and be assessed on their ability to develop the most efficient and elegant solutions. Challenges will allow students to hone the problem-solving and programming skills acquired in their previous CS courses. Challenges derive from familiar problems, including sorting contact names in a cellular phone, determining shortest paths for delivery of products by trucking fleets, and scheduling students for classes. Both time and space complexity will be evaluated for each student's algorithms to optimize solutions. Students will learn to identify which problems require approximation algorithms and heuristics when optimal solutions are too time-prohibitive to find. Students will use various algorithm techniques to find solutions to real-world challenges found within Pittsburgh and abroad. The course will prepare students for college-level computer science, mathematics, and engineering courses, and improve critical thinking skills applicable to any discipline.

Students will:

- understand how to analyze algorithm efficiency;
- discuss the ethical implications of algorithm development and responsible coding practices;
- use proper coding standards using standardized documentation systems such as javadoc or pydoc;
- master advanced aspects of various programming languages;
- learn advanced data structure implementation and design including queues, stacks, linked lists, graphs and trees;
- develop algorithm techniques of dynamic programming, reduction, and parallel programming;
- learn advanced software development techniques, including collaborative coding and application design using the Agile Development Methodology;
- and present at the year-end STEM Symposium.

PERFORMING ARTS

Department Chairs: Ms. Janna Lettan & Mr. Dan Sadowski

MUSIC

Learning Music through the Lens of The Beatles, Rock History, and Hip Hop

(Open to all grades) Trimester - 2 credits

Through the music of The Beatles, who incorporated traditional "Tin Pan Alley" writing with "the Blues," examining "the Blues" and its powerful influence on Rock History, and exploring the development of "hip hop" from its rhythm and blues roots to the cultural force and influence it is today, we will learn the basic elements of music such as form, scales, triads,

melody, and rhythm. Elements of the African-American creation, “The Blues,” permeate all our contemporary musical styles. A course teaching music essentials does not have to be cold and predictable. This course is designed to listen to the music of our lives, the music we listen to everyday, the music that means the most to us, with a better understanding and “feel.”

Learning Music through the Lens of World Cultures

(Open to all grades) Trimester - 2 credits

In this course we will be studying styles of music from around the globe, while learning the important elements of music. World music has come to include not only traditional music from various cultures, but also the cross-cultural music influence that has contributed to creating new styles of music. City as Our CampusSM experiences will be an integral part of this course, and we will welcome to our class such performers as the Klezmatic Klezmer Group, a virtuoso bagpiper, Brazilian vocalist, Kenia, authentic African Drummers, and the Purple Bamboo Chinese Ensemble, all to broaden our understanding of the cultures, instruments, and traditions that enhance our appreciation of music from around the world. Students will complete a research project presentation further examining a music and culture not covered in class, such as delving into the music of their own family culture.

Music Technology and the Recording Experience

(Open to all grades) Trimester - 2 credits

This class, for both musician and non-musician, aims to release the creative energy and talent within each individual student. Students will learn to use the computer and piano keyboard to compose, notate, analyze, and improvise music, as well as engage in real time and real life experiences in a major recording studio. We have partnered with Mr. Small’s Recording Studios, Larry Luther, recording engineer, through our City as Our Campus field trips over the past four trimesters. In Musical Instrument Digital Interface (MIDI), students will compose original pieces, both in performance playback and printed material formats. **Finale, Garage Band, Musescore, and Ableton** are the primary software programs used. The topics for exploration in the studio include: MIDI, basic audio theory, equipment, studio design, mixing with pro tools, and the mastering process.

Songwriting

(Open to all grades) Trimester - 2 credits

Did you ever listen to a tune and wonder why it’s a hit? Did you ever hear a song or a lyric and think, “I could write a better song than that?” Through analyzing all styles of famous tunes through the years, paying careful attention to the art of writing a hook, performing specific writing exercises, and developing your listening habits, students can unlock their creativity and songwriting potential. Activities in the class will include writing exercises such as original titles and analysis, the “laundry list” technique of lyric writing, blues analysis and original composition, lyric completion exercises, and practicing chord progressions at the piano. Major scales, triads, common chord progressions, melody writing knowledge and skills, and other general music knowledge will be incorporated. The course will culminate in students applying their skills to create a fully-realized, completed song.

ENSEMBLES

Guitar Ensemble

(Open to all grades) Year - 3 credits

Prerequisites: Ability to read music on guitar, at beginning level (basic position)

Students will play in a group and perform different styles of music such as contemporary rock, classical melodies, and light jazz compositions. . Performances include a winter performance in December, a spring performance in May, and occasional outside performances. All dress rehearsals and performances are required and are a part of the student's grade. Though our main purpose is to prepare for our concerts, students will also learn skills such as note-reading, sight-reading, the art of ensemble playing, elements of "time," phrasing for the style of music being played, "guitar-centric" chords and rhythms, and scales for improvisation.

Jazz Band

(Open to all grades) Year - 3 credits

Prerequisites: Ability to play brass, woodwind, percussion, or keyboard instruments at the advanced beginner level or higher; ability to read music.

Students will play in a group and perform various styles of music such as traditional and contemporary jazz, big band swing, and pop and rock classics. Performances include a winter performance in December, a spring performance in May, and occasional outside performances. All ensemble members are required to perform at daytime assemblies and some evening performances. All dress rehearsals and performances are required and are part of the student's grade. Though our main purpose is to prepare for our concerts, students will also learn skills such as sight-reading, the art of ensemble playing, elements of "time," how to "swing," appropriate phrasing for the style of music being played, and scales for improvisation.

Orchestra

(Open to all grades) Year - 3 credits

Prerequisites: Open to students who play string, wind, brass, percussion, and keyboard instruments at the level of advanced-beginner or higher.

Students play in an ensemble and perform various repertoire from concert bands, wind ensembles, and symphony orchestras. Some members may be asked to play for the Upper School musical. Performances include a winter performance in December, a performance in March, and occasional outside performances, such as in the Carnegie Music hall foyer prior to Chamber Music Pittsburgh concerts. All dress rehearsals and performances are required and are part of the student's grade. Though our main purpose is to prepare for our concerts, students will also learn skills such as sight-reading, the art of ensemble playing, elements of "time," and appropriate phrasing for the style of music being played. The orchestra will perform pieces from the Baroque, Classical, Romantic, and Contemporary periods, as well as the best in pop music and movie and television themes.

Chorus

(Open to all grades) Year - 3 credits

This course is designed for students interested in performing as a member of a vocal ensemble. Students will learn music of various styles, languages, and time periods as they prepare for on and off-campus performances. Repertoire may include selections from, but not limited to, the great Western art music (sacred and secular), folk and multicultural music, vocal jazz, pop, and musical theater. Students will strengthen individual vocal technique and enhance music listening and reading skills. This course requires some evening and weekend commitments. All dress rehearsal performances are required and are part of the student's grade.

Dance Ensemble

(Open to all grades) Year - 3 credits

This fun-filled, upbeat class will get your heart rate going and your creativity flowing because here at WT we don't just think we can dance ... we know we can dance! Dance Ensemble is a performance-based course where much of the class time is devoted to learning and developing specific choreography for performance. No previous training or experience is required—just an interest in learning dance skills, getting in shape, and experimenting with dance styles you've always wanted to explore. A variety of dance genres and skills are covered including but not limited to: jazz, musical theatre, tap, hip hop, and modern dance. Student choreographers and soloists are encouraged to stretch their talents and to challenge themselves both physically and creatively. All students in the dance ensemble are required to perform in the annual spring dance performance and participate in the mandatory dress rehearsal that takes place after school prior to the performance. The dates for the dress rehearsal and the dance show are announced in September so that students and families can plan accordingly. This class may be taken for P.E. or Performing Arts credit (PE credit not available for students in class of 2025 or later)

THEATRE ARTS

Theater Arts

(Open to all grades) Trimester - 2 credits

This course introduces and explores theater from page to stage as a live performing art. It is designed to combine an overview of the art with as much creative and practical experience as possible. Areas of study include theater history, dramatic action, comedy improv, acting, directing, and playwriting. Students will also complete a project in an area of their own choice.

Technical Theater Design

(Open to all grades) Trimester - 2 credits

This course will introduce the student to the fundamental elements and principles of theatrical design. Students will read a script, and create designs in the areas of scenery, lighting, sound, props and costumes. . Each area's practice is explored and analyzed through a series of exercises that incorporate design projects.

Technical Theater Production

(Open to all grades) Trimester - 2 credits

This course is for students who want to avoid the spotlight and explore the behind-the-scenes, hands-on, technical aspects of theater production. Areas of study include drafting, set construction, stage management, props, lighting, sound, costumes, and stage makeup effects. This is a hands-on course in which students use building tools, run sewing machines, apply stage make-up, and operate lights.

VISUAL ARTS

Department Chair: Ms. Kate Gugliotta

African Art

(Open to all grades) Trimester - 2 credits

This studio course explores the various art forms of the continent of Africa ranging from the pre-colonial to contemporary times. Students will be introduced to the various aspects of traditional and contemporary African art through lectures, film, field trips, music, artifacts, and visual art. The objects, images, and sites featured in this course represent only a small cross-section of the diverse ethnic and cultural traditions found throughout Africa. Students will create art pieces using methods such as: textiles, sculpture, metalsmithing and painting in response to the topics covered in class. The class will include a student research assignment, reading assignments, student visual art projects, and City as Our Campus experiences inspired by the thematic studies of the rich and diverse expressions found within this vast continent.

Objectives:

- Demonstrate an ability to effectively discuss and interpret African aesthetics in the terms and values that are appropriate to the historical period and the culture
- Conduct in-depth collaborative research for an oral presentation on traditional African art forms
- Expand skills to interpret African art from diverse cultural backgrounds and functions by class comparisons and visual analysis
- Develop a strategy for looking at and understanding African art within and outside of its original context

Contemporary Sculpture

(Open to all grades) Trimester - 2 credits

This course is an introduction to traditional and non-traditional sculpture techniques. Students will learn how to create three-dimensional works inspired by various themes. Field trips will occur to view and discuss sculpture masterpieces, both ancient and contemporary. Students will explore wood, plaster, clay, mixed media, and paper to broaden their understanding of contemporary sculptural art trends in Pittsburgh and beyond.

Objectives:

- Explore various materials and processes used in sculpture to realize four core artistic projects
- Identify the styles and concepts of both past and contemporary three-dimensional work through critical thinking skills, design and creative thinking
- Self-criticize and verbalize about one's art and to understand criticism by others
- Demonstrate understanding of tools, materials, techniques, and processes

Decorative Glass

(Open to all grades) Trimester – 2 credits

This course introduces students to the use of glass as an artistic medium. The students create a variety of colorful, imaginative projects using the following techniques: decorative mosaics and stained glass.

Decorative Mosaics: The students explore the potential of mosaics as a medium of personal expression. Color, pattern, and texture combine to make mosaics visually appealing art forms. Each student uses materials such as glass, beads, pebbles, shells, china, and ceramic tiles to create a variety of projects, including mirror/picture frames, pots, coasters, wall plaques, or paving stones.

Stained Glass: The students use the copper foil technique of stained glass art (used to produce the famous Tiffany windows). Each student draws patterns, cuts and foils the glass pieces, solders the pieces together, and applies patina finishes. This results in a variety of projects, such as unique sun-catcher window hangings or picture and mirror frames.

Digital Art

(Open to all grades) Trimester – 2 credits

This course introduces students to the use of the computer as a tool for making creative, artistic, and personal images. Students will learn about different types of cameras, scanners, storage devices, and printing techniques used in the imagery industry. They will learn how to capture, store, manipulate, and output images. Adobe Photoshop, Illustrator, and InDesign will be used as students create original images, design for print materials or webpages, and manipulate existing images or photographs artistically. This course will also provide opportunities for students to design and produce projects such as logos, posters, brochures, and presentations for their other classes and/or extracurricular activities.

East Asian Pottery

(Open to all grades) Trimester - 2 credits

This studio course serves as an introduction to the role of traditional and contemporary ceramic forms from China, Japan, and Korea. Each unit of study will explore the intersections of art, politics, religion, culture, and the natural world. Students will study ceramic forms through various formats: lectures, guest artist presentations, field trips, student ceramic projects, and City as Our Campus experiences. The course will introduce specific styles and techniques that highlight the various ceramic arts forms in relation to the history and culture of their respective time periods and places.

Objectives:

- Develop an understanding of how pottery expresses the complex artistic, social, economic, political, and religious traditions from historical periods and various cultures of East Asia
- Discuss, analyze, and identify a diverse array of East Asian pottery forms and styles from the past to the contemporary
- Develop cultural competency and familiarity with the history, geography, and cultures of East Asia
- Demonstrate the ability to communicate orally in clear, coherent, and persuasive language

Filmmaking

(Open to all grades) Trimester – 2 credits

This course provides an opportunity for students to learn and apply skills involved in filmmaking and digital video production. Students will focus on planning, shooting, and editing a variety of creative projects. They will explore the aesthetic and technical aspects of writing scripts, drawing storyboards, capturing images with still and video cameras, and editing content properly and creatively. Students will concentrate on subject matter of personal interest while producing their media projects. A major video assignment will culminate in shooting footage on a site off-campus, and students may visit institutions such as Pittsburgh Filmmakers for inspiration.

Functional Pottery

(Open to all grades) Trimester - 2 credits

This course introduces students to a variety of fundamental techniques for creating functional pottery. Students will explore both wheel throwing and handbuilding techniques. Emphasis will be placed heavily on function, form, and surface treatment. Students will learn to construct tableware items such as bowls, teapots, cake platters, and vase forms of various sizes. Students will also explore the history of ceramics through the ages by viewing original works, screening demonstration videos, and interacting with a guest ceramic artist.

Objectives:

- Experiment and develop skills in multiple art-making techniques and approaches through practice
- Learn the technical skills, vocabulary, processes and materials related to using clay as an art material for creating pottery and sculpture
- Increase knowledge of historical and contemporary practices in ceramic art
- Develop critical skills for analysis and discussion of art works
- Learn the technical skills, vocabulary, processes and materials related to using clay as an art material for creating functional pottery

Fundamentals of Drawing and Creative Art Journaling

(Open to all grades) Trimester - 2 credits

Discover the fun and mindful qualities of drawing. This course is suitable for both beginning artists and more advanced drawing students. This is an essential class for any student hoping to submit a portfolio for college admission or who is interested in continuing their art studies at a more advanced level. We will explore various projects intended to enhance your observational skills and drawing abilities. Projects covered in this course will include: gesture and contour drawings, negative and positive space, shading and tonal studies and perspective drawings. You will use a variety of drawing media such as ink, charcoal, pencil, colored pencil and pen. Additionally, many projects will involve using an art journal creatively. Develop your own expressive style while mastering the fundamentals of drawing. Artistic experiences such as outside workshops and museum excursions are an essential part of this course.

Students will:

- Enhance and expand their visual literacy through their exposure to different artists and artistic style.
- Develop basic descriptive, critical and analytical skills.
- Master an understanding of the elements of art and design and its related vocabulary.
- Be able to plan and create an artwork that demonstrates a competent visual organization and design based on their understanding of the visual elements of art.
- Demonstrate technical mastery of two-dimensional drawing media through the successful completion of their assigned projects.
- Be encouraged to work both independently and collaboratively.
- Be able to analyze, evaluate, and critique artwork in both oral and written form using art-specific vocabulary.
- Will develop an appreciation of art and art production as a vital aspect of the human experience.
- Will demonstrate a deeper connection of their artwork with broader personal, societal, cultural and/or historical issues.

Handmade Book Art

(Open to all grades) Trimester - 2 credits

This course introduces students to various techniques for constructing handmade books. Students will experiment with various contemporary and traditional bookmaking methods and material. A strong emphasis will be placed on creating books that are sculptural. Each project will be inspired by specific material, method, and theme. Students are encouraged to incorporate drawings, photography, collage, and other materials into their works. This class will cultivate innovation and experimentation. A field trip to Carnegie Mellon University's Rare Books Collection will be incorporated into the course to offer inspiration.

Objectives:

- Select appropriate media relative to concepts and forms of book making
- Produce creative works that demonstrate innovation in concepts, formal language and/or materials
- Demonstrate problem-solving skills by providing a step-by-step approach to specific issues in class projects

- Develop the technical skills and conceptual skills necessary to create a cohesive body of artwork
- Make connections between visual arts and other disciplines

Handbuilding Ceramics

(Open to all grades) Trimester - 2 credits

This course introduces students to various handbuilding techniques for constructing ceramic forms: pinch, coil, and slab building methods. Students will learn to glaze, carve, and add texture to their projects. The class will view and discuss the techniques used in both ancient and contemporary ceramic masterpieces. Student projects will include explorations of figurative sculpture, functional pottery, and decorative tiles.

Objectives:

- Learn the vocabulary, technical skills, processes and materials related to using clay as an art material for pottery
- Learn and practice a variety of forming techniques with clay including pinching, coiling, slab work, use of hump molds, texture techniques and combining techniques to create functional and sculptural artwork
- Develop the ability to constructively criticize student and peer work through oral, written formats.

Metalsmithing: Level 1

(Open to all grades) Trimester - 2 credits

This course will explore introductory techniques for metalsmithing. The course will begin with learning basic metalsmithing skills. Student projects will include original jewelry designs bracelet, earrings, key chain, and a ring made using various metals. Through this course, students will gain knowledge of how to manipulate metal using equipment and power tools. Students will also have an opportunity to study with a regional artist from a local arts organization to learn a traditional method that has a contemporary twist.

Objectives:

- Apply elements and principles of design in metals projects
- Demonstrate appropriate use of tools and processes
- Produce creative designs that explore a variety of media and tools
- Evaluate art and designs through oral and/or written critiques
- Demonstrate the ability to communicate orally in clear, coherent, and persuasive language

Metalsmithing: Level 2

(Open to all grades) Trimester - 2 credits

Prerequisite: Metalsmithing Level 1

This course will expand on the basic skills learned in Metalsmithing: Level 1. Students will learn more advanced metalsmithing techniques and processes. Concept development and sophisticated design is emphasized. Students will be given the opportunity to develop independent projects and to cultivate their own artistic style. Students will explore techniques and processes using non-ferrous metals while creating design solutions to challenging assignments. The course emphasizes active participation, technical skill development, conceptual thinking, and problem solving. A guest artist will also engage with students to inspire independent explorations and class assignments.

Objectives:

- Present a body of work which shows an extended and advanced knowledge and skill set over Metalsmithing Level 1
- Demonstrate the ability to communicate orally in clear, coherent, and persuasive language
- Demonstrate knowledge in jewelry theory and practice through experiences in different media

Painting: Acrylic, Watercolor and Mixed Media

(Open to all grades) Trimester - 2 credits

Discover the powerfully expressive potential of color in art through the techniques of acrylic painting, watercolor and mixed media. You will learn about color theories, color mixing, blending, and the individual properties and qualities of each technique we use. Develop your observational skills, your mastery of a variety of painting media and your own personal expressive style while creating frame-worthy paintings to hang on your walls. Provisions are made for more advanced students to explore more creative, personal innovations and more advanced artistic expressions in their paintings. Artistic experiences outside of the classroom are an essential part of the course.

Students will:

- Enhance and expand their visual literacy through their exposure to different artists and artistic styles.
- Develop basic descriptive, critical and analytical skills.
- Master an understanding of the elements of art and design and its related vocabulary.
- Appreciate the powerful visual and design potential of color in their compositions.
- Be able to plan and create an artwork that demonstrates a competent visual organization and design based on their understanding of the visual elements of art.
- Demonstrate a mastery of the various color media through the successful completion of their assigned projects.
- Be encouraged to work both independently and collaboratively.
- Be able to analyze, evaluate, and critique artwork in both oral and written form using art-specific vocabulary.
- Will develop an appreciation of art and art production as a vital aspect of the human experience.
- Will demonstrate a deeper connection of their artwork with broader personal, societal, cultural and/or historical issues.

Photography: Introduction to Photography

(Open to all grades) Trimester – 2 credits

This is a practical and theoretical course that introduces students to the art of taking, developing, printing, and evaluating black-and-white photographs. Students will learn to use a 35mm camera and the darkroom techniques for developing film and printing from negatives. Shooting and printing assignments teach students basic principles of design, including visualization, composition, and perspective. For this course, students will use 35mm SLR film cameras (the traditional manual cameras with a full range of aperture settings and shutter speeds).

Photography: Advanced Photography

(Open to all grades) Trimester – 2 credits

Prerequisite: Successful completion of Photography 1 or Introduction to Photography.

This course allows students to further develop the photography skills they learned in the Introduction to Photography course. Shooting and printing assignments involve topics/themes of personal interest. Creativity and the application of good design principles and darkroom techniques are encouraged and expected in this

course. For this course, students will use 35mm SLR film cameras or digital cameras, depending on the projects pursued.

Printmaking

(Open to all grades) Trimester - 2 credits

Develop your two-dimensional artistic skills and your own expressive personal artistic style by using a variety of printmaking techniques. Create multiple copies of a single design or image through the exploration of a simple Styrofoam relief project, monotype prints, linoleum block projects, a dry point and a silk screen project. City as Our Campus experiences will include a silk screen workshop at AIR and a tour of the Warhol Museum.

Students will:

- Enhance and expand their visual literacy through their exposure to different artists and artistic styles.
- Develop basic descriptive, critical, and analytical skills.
- Master an understanding of the elements of art and design and its related vocabulary.
- Be able to plan and create an artwork that demonstrates a competent visual organization and design based on their understanding of the visual elements of art.
- Demonstrate a mastery of various printmaking techniques through the successful completion of the assigned projects.
- Be encouraged to work both independently and collaboratively.
- Be able to analyze, evaluate, and critique artwork in both oral and written form using art-specific vocabulary.
- Will develop an appreciation of art and art production as a vital aspect of the human experience.
- Will demonstrate a deeper connection of their artwork with broader personal, societal, cultural and/or historical issues.

Public Art

(Open to all grades) Trimester - 2 credits

Students will have the opportunity to work individually and collaboratively on various proposals for public interventions. We will study the history of public art and also the current international trends. This course will require students to express their proposal ideas through drawing, mixed media, collage and other graphic media. There will also be opportunities to create small scaled site specific interventions. City as Our Campus field trips will be designed to engage the various urban interventions found locally in Pittsburgh. Local public artists and art practitioners will also be engaged to inspire and to give critical feedback on the direction of student projects. The course culminates with an exhibition and/or public installation that will allow the students an opportunity to express their ideas in a public venue.

Objectives:

- Develop a familiarity with the critical issues surrounding public art in urban spaces, while also applying that knowledge to specific examples of public art in Pittsburgh neighborhoods
- Become acquainted with the characteristic features of public art and understanding what distinguishes it from other types of art
- Learn to analyze the relationships among content, context, and style
- Prepare an appropriate, authentic submission for a piece of public art
- Enhance visual literacy and critical thinking skills
- Students will be able to work together toward a shared purpose relevant to the course/discipline and with a sense of shared responsibility for meeting that purpose

Urban Art

(Open to all grades) Trimester - 2 credits

Students will work in depth with traditional and non-traditional methodologies to explore the multiple facets of street art forms. Mediums such as stencil art, street photography, painting, graffiti, found object sculptures, and portraiture will be explored. Student projects will challenge and expand their personal interests, while also creating opportunities for creating art that communicates ideas to an audience that exists beyond the classroom setting. This dynamic course will integrate the expertise of regional artists and other local resources. Both individual and collaborative projects will be explored.

Objectives:

- Reflect on art after visiting museums, galleries, and artist studios
- Demonstrate the ability to communicate orally in clear, coherent, and persuasive language
- Work collaboratively to form a joint vision and a shared purpose relevant to the course/discipline and with a sense of shared responsibility for meeting that purpose
- Demonstrate the ability to synthesize varied sources of information, acknowledge the artistic contributions/insights of various artists, and make independent judgments.

AP Art History

(Open to Juniors and Seniors) Year - 6 credits

Discover the power of art as we decenter the traditional canon of art in order to make it vitally and critically relevant in our time. Art History is a thematic course in the history of Global art traditions that examines works of art and architecture from the time of Prehistoric peoples to the present. This course focuses on relating works of art and architecture from the College Board 250 list of works to the historical contexts within which they were created. The course, therefore, is designed to facilitate your understanding of how works of art and architecture may be interpreted as historical documents or artifacts, and as vital aspects of our contemporary human experience. You will question what is a work of art, how is it made, why is it made, and how does it both reflect and influence its historical and cultural context. As you learn to address these vital questions about art, you will master essential art historical thinking skills such as visual analysis, contextual analysis, comparative analysis, art historical interpretation and argumentation. Some of the themes covered in this course are: What is Art?, Public Art and Architecture, Representing the Self and Others—Identity, Power and Status in Art, Installation Art, and Race, Gender and Class in Art. You will actively be engaged in the course material through in-class discussions, presentations and other activities. Numerous trips to local museums, galleries, and walking tours of public art and architecture are an essential aspect of this course.

OTHER REQUIRED ELECTIVES

Health

(Sophomores in the class of 2024) Trimester - 2 Credits

In our health and wellness curriculum, WT strives to bring about increased Health Literacy among students by preparing and empowering them to value and engage in life-long healthy lifestyles and practices, while promoting self-management skills and smart decisions. Through the trimester class as well as our grade-level seminar series, students will acquire knowledge and skills related to stress and coping, healthy relationships and sex education, nutrition, social emotional wellbeing, suicide prevention, mindfulness, and chemical and alcohol dependency. *(Only for sophomores who have not yet met the Health requirement)*

Physical Education

(Sophomores and Juniors) Trimester 2 - each year (6 credits total)

As part of our health and wellness programming, students must enroll in a regularly scheduled P.E. program for two trimesters during each of the first three years in Upper School. The goal of the class is to help students to fully comprehend the importance of leading an active and healthy lifestyle within their current daily routine as well as give them the knowledge and experience to continue this pattern for a lifetime. The program will allow the student to experience physical activity and its ability to allow a person to perform daily activities at a high level as well as reduce the risk of long-term health problems. The learning environment will encourage each student to try new skills and allow him or her to make personal decisions about how he or she can best carry out a healthy lifestyle. (Students who play on a WT team or who participate regularly in an outside athletic team are exempt from P.E. class during their athletic season. Non-WT athletics require approval for an exemption.)

9th Grade: Health, Wellness & Physical Education Seminar

(Required for Freshmen, starting 2021) Year - 2 credits

In this year long seminar series students will engage with a broad range of topics and activities that are designed to prepare and empower them academically, socially, emotionally, financially, physically and spiritually. The seminar will help students develop organizational, note-taking, study, and research skills, acquire knowledge and skills related to stress and coping, healthy relationships and sex education, nutrition, physical well-being, social emotional wellbeing, suicide prevention, mindfulness, and chemical and alcohol dependency.

Speech: The Art of Public Speaking

(Open to all grades) Trimester - 2 credits

This course is designed to train students to speak confidently and competently in a public forum. It offers both theory and practice in all areas of oral expression. General areas of study are speech delivery, speech composition, persuasion, effective listening, group discussion, and debate. Required for graduation.

MALONE SCHOOLS ONLINE CONSORTIUM (MSON)

Academic Liaison: Dr. Anne Fay

MSON courses provide Winchester Thurston students with the opportunity to take special topic courses offered by select private schools around the country. Courses use a blended approach, combining synchronous, real-time video conferencing seminars delivered in high-definition classroom set-ups, with asynchronous instruction such as recorded lectures and exercises students complete outside of the class. Courses are taught by faculty from the Malone Scholars Schools and the Stanford Online High School. Each course has a minimum of six and a maximum of 16 students, allowing for a highly interactive, virtual discussion seminar setting. Courses meet twice each week for an hour and are either one semester (September through December or January to mid-May) or year-long.

World Languages

ANCIENT GREEK I (YEAR) Monday / Wednesday, 3:35-4:35pm Grade Level: 11-12 Prerequisite: None
Instructor: Briana Titus, Casady School, Oklahoma City, OK

This is a beginning course for students who have not studied ancient Greek before or whose background in Greek is not sufficient for more advanced work. Students proceed through a study of grammar and vocabulary

to the reading and writing of sentences and short narratives in the language of Athens of the fifth century B.C.E. Selected topics in Greek history and art are also considered.

WORLD LANGUAGES ARABIC I (YEAR) Section B: Tuesday / Thursday, 3:35-4:35pm Grade Level: 9-12

(Juniors receive priority) Prerequisite: None

Instructors: Farha Abubaker, Hopkins School, New Haven, CT, Kaveh Niazi, Stanford Online High School, Stanford, CA

This first-year course of a two-year sequence is an introduction to Modern Standard Arabic, the language of formal speech and most printed materials in the Arab-speaking world. Students will learn to read and write the Arabic alphabet and will develop beginning proficiency in the language. Through frequent oral and written drills, students will develop their basic communication skills. (First of a two-year sequence)

FRENCH SEMINAR: NATIONAL IDENTITIES (YEAR) Tuesday / Friday, 1:20-2:20pm Grade Level: 11-12

Prerequisite: Level 5 French/AP French Language and Civilization or equivalent. Instructor: Tilden Daniels, Hopkins School, New Haven, CT

This course is designed for students who have successfully completed French level 5. The college level topics are chosen to prepare students for studying French beyond high school and to provide deeper insight into French and Francophone cultures. Students examine various topics in French language, history, culture, cinema, and literature while interpreting authentic documents. Faithful to the idea of a seminar, the course requires students to be responsible for extensive reading and preparation. Activities including compositions, oral presentations, and discussions enable students to achieve a high level of proficiency in speaking and writing. The literary texts studied are often paired with a film in order to give students an opportunity to gain a deeper understanding of francophone culture and to improve their listening skills. Each work is also studied with an historical perspective. For example, *La Chanson de Roland* is studied along with the hit comedy *Les Visiteurs* (1993) and an exploration of Charlemagne, the Battle of Hastings, and the crusades. Similarly, *L'Exil et le Royaume* by Albert Camus is studied along with the film *Loin des Hommes* (2014) and an exploration of France at the time of Algerian War (1954-1962). With an eye towards the theme of "national identities," students are asked to consider how each work helps to reinforce and question an individual's sense of identity and belonging to a nation and its values. This class is conducted entirely in French.

HUMANITIES & SOCIAL STUDIES

BOB DYLAN'S AMERICA (FALL) Monday / Wednesday, 4:40–5:40pm Grade Level: 11-12

Prerequisite: Previous or concurrent enrollment in American Literature and American History

Instructor: Dean A. Masullo, Ph.D., University School of Nashville, Nashville, TN

Arguably the most influential, important, and closely scrutinized American artist of the past six decades, Bob Dylan is as difficult to define as the nation that produced him. Connecting his work to contemporary theories of cultural memory, this course looks at the ways in which Dylan, both in his music and his cultivation of various public personae, maps the contours of the national imagination and explores the prevailing attitudes of class, race, gender, and place in American culture. Proceeding chronologically and using Dylan's masterworks and subsequent official "bootleg" recordings as touchstones, students will consider a variety of texts, including poetry, fiction, and cultural history; biography and autobiography; and popular and documentary film, including Greil Marcus' *The Old, Weird America: The World of Bob Dylan's Basement Tapes* (2001), Murray Lerner's

Festival (1967), D. A. Pennebaker's Don't Look Back (1967), and Martin Scorsese's No Direction Home (2005) and Rolling Thunder Review: A Bob Dylan Story (2015). Access to a music streaming service such as Spotify or Apple Music is required; access to video streaming services such as Netflix and Amazon Prime is strongly recommended.

DIVERSITY IN A GLOBAL COMPARATIVE PERSPECTIVE (FALL) Tuesday / Thursday, 3:35–4:35pm Target Grade Level: 11-12 Prerequisite: None
Instructor: Dr. John Aden, Ph.D., Canterbury School, Ft. Wayne, IN

This course examines the ways our Human Family has sought to create, marshal, contest, and maintain identities through Culture and relations of power. These identities can be appreciated through “lenses of analysis.” The course critically engages the traditional “Big Three” lenses of analysis: Race, Class, and Gender, understanding that Culture serves as an important backdrop against which these identities emerge. Once students appreciate the important ways the Social Sciences have engaged with, written about, and debated these three core modes of analysis, the course expands to incorporate other, equally rich, lenses: age, ableism, intellectual diversity, geographic diversity, cognitive and neurological diversity, and the business case for Diversity, as well as how to study synergistically intertwined phenomena. Film and Critical Film Studies, as well as the role Colonialism has played in the major conflicts of the last 500 years, each serve to enrich student understandings of Diversity.

ENVIRONMENTAL BIOETHICS - EXPLORING THE CHALLENGES OF LOCAL AND GLOBAL CHOICES (SPRING) Tuesday / Friday, 3:35–4:35pm Grade Level: 11-12 Prerequisite: None
Instructor: Ellen Johnson, Ph.D., Wilmington Friends School, Wilmington, DE

This course will focus on such cases as environmental sustainability, global energy and food resources, gathered from sources in literature, journalism, and film. The academic study of ethics examines how people make the decisions. Curricula will build on a foundation of theoretical moral theories, more specifically, how one makes decisions when faced with complex, often controversial, issues. No prior knowledge of philosophy is assumed, however, authentic assessment of students' initial facility with logical analysis will ensure that all students are challenged to grow and deepen their theoretical and practical understandings of the subject.

ETYMOLOGY OF SCIENTIFIC TERMS (FALL) Tuesday / Friday, 2:30–3:30pm Grade Level: 11-12
Prerequisite: None
Instructor: David Seward, Winchester Thurston School, Pittsburgh, PA

The purpose of the course is, to quote the textbook, “By teaching ... the root elements of medical terminology – the prefixes, suffixes, and combining forms of Greek and Latin ... not only to teach students modern medical terminology, but to give them the ability to decipher the evolving language of medicine throughout their careers.” This is in many ways a language course and deals with elements that are used to create terms to meet the specific needs of medical scientists. As material is introduced, students will complete practice exercises during each class meeting, as well as complete approximately one quiz per week. Outside of class, students are expected to analyze and define fifty terms each week. Additional material deals with complex etymologies, the history of our understanding of certain aspects of medical science, and relevant material from Greek and Latin texts.

THE FICTION OF JAMES JOYCE (SPRING) Monday / Wednesday, 3:35–4:35pm Grade Level: 11-12
Instructor: Aaron Lehman, Porter-Gaud, Charleston SC
Prerequisite: Recommended past or concurrent enrollment in either AP Language & Composition or AP Literature & Composition or the equivalent

James Joyce created the most beautiful literature of the Twentieth Century, prose that has thrilled and at times confounded readers for generations. Simply put, *Ulysses*, his 1922 masterpiece, changed the landscape for the novel as a whole. This course will unpack the mystery and loveliness of two Joyce novels, *A Portrait of the Artist as a Young Man* and *Ulysses*, giving students the close-reading tools to appreciate and make sense of Joyce's particular literary power, to scale the edifice of *Ulysses* to see it for what it truly is: a marvel of stylistic achievement, a testament to the ways in which language shapes us as we shape it, and, at its core, a gorgeous love story and an exploration of the everyday heroism that we often overlook. In particular, we will explore how Joyce tried to render the authentic human experience through language: how Joyce wanted literature to look and feel more like life than like "art," how he wanted literature to mirror the texture of the actual thinking and feeling mind. To that end, while the course will give students an intensive look at arguably the greatest literary mind since Shakespeare, it will also have us—teacher and student alike—consider what it means to inhabit fully our hearts, minds, and selves in the modern world.

GLOBAL VOICES OF OPPRESSION: LITERATURE FOR SOCIAL JUSTICE (FALL) Wednesday / Friday, 3:35-4:35pm Grade Level: 11-12 Prerequisite: None

Instructor: Linda Rodriguez, St. Andrew's Episcopal School, Jackson, MS

This semester seminar is designed as a survey of literature that focuses on expressions of oppression. From protest to processing, persecuted populations have created many mechanisms to give voice to their suffering. Books, memoirs, songs, short stories, and documentaries will all be used to discover the power of personal experience. Additionally, the class will explore the ways in which oppressed voices have been instruments in forcing positive social change throughout the 20th century.

MAKING ETHICAL MEDICAL CHOICES IN A DIVERSE WORLD (FALL) Tuesday / Thursday, 3:35-4:35pm Grade Level: 11-12 (occasional 10th, at the recommendation of home school administrator) Prerequisite: None Instructors: Ellen Johnson, Ph.D., Wilmington Friends School, Wilmington, DE Joyce Lazier, Canterbury School, Ft. Wayne, IN

The objective of this course is to provide students with the tools and experience necessary to better make difficult, ethical decisions. In order to achieve this, we will study and evaluate critically several different ethical theories including Utilitarianism, Virtue Ethics, and Deontology. Which framework students choose to use as their guide is up to them, but by the end of this course they should be able to defend their choices and ethical decisions clearly. The course strives to develop a cross conversation between two academic disciplines - philosophy (ethics) and biology (medical research, molecular genetics). This is a collaborative teaching effort between Joyce Lazier (background in philosophy and ethics) and Ellen Johnson (background in biology and genetics), and an evolution of two previously existing courses. Both teachers will be present for all classes, focusing on the growth that comes from a shared discourse.

A NATION DIVIDED: THE LITERATURE OF CIVIL RIGHTS IN THE MODERN US (SPRING) Wednesday / Friday, 3:35-4:35 pm Grade Level: 11-12 Prerequisite: None

Instructor: Linda Rodriguez, St. Andrews Episcopal School, Ridgeland, MS

The story of equality in America is a tale of aching slow but steady progress. From the Civil War to the present day, the path toward equal rights has never been direct or secure. This semester course is designed as an interdisciplinary exploration of the quest for civil rights throughout the 19th and 20th centuries as it relates to African Americans, women, Native Americans, Asian Americans, migrant workers and the LGBTQ community. Special focus will be given to the indelible role that the deep South played in the struggle. Students will work with various texts including Supreme Court Cases, memoir, essays, poetry, short fiction, and primary source

documents. Additionally, students will design and implement their own oral history projects as a culmination to the class.

THINK GLOBAL, DEBATE LOCAL (FALL) Tuesday / Thursday 4:40–5:40 pm Target Grade Level: 10-12

Prerequisite: None

Instructor: Dan Jacobs, Roeper School, Bloomfield Hills, MI

Water justice. Gentrification. Housing. Education. Race Relations. Public Safety. Environmental Issues. Is it wrong to shut off water service to households that are delinquent on their water bills? Is access to affordable housing a human right? Should environmental issues take priority over the needs of businesses? Do we have an obligation to help asylum seekers? People all around the world struggle with these and other challenges. In Think Global, Debate Local, we use issues in our own neighborhoods to take deep dives into the facts and philosophies underlying the challenges, values, and perspectives that shape our world on scales ranging from the personal to the global. The overarching goal of this course is for students to teach each other about important topics in their own neighborhoods, towns, states, and regions, and to use debate as a tool to examine the perspectives surrounding those topics. Other goals include achieving a better understanding of complex issues by taking on and arguing for the viewpoints of various stakeholders; discovering ways to shift from an adversarial to a cooperative relationship when disagreements arise; and understanding the ways different values can be used as filters through which a given issue can be viewed. Please note that this course is geared toward beginning debaters with an emphasis on basic argumentation, not competition, although more experienced debaters are welcome.

STEM

INTRODUCTION TO ORGANIC CHEMISTRY (FALL) Monday / Thursday, 2:30–3:30pm

Grade Level: 11-12 Prerequisite: Chemistry

Instructor: Jocelyn Rodgers, Ph.D., Maret School, Washington, DC

This semester course will provide useful background information in organic chemistry by covering topics not typically found in high school chemistry courses. The course will give insight into the importance of the chemistry of carbon compounds to our daily lives. Topics covered will include organic nomenclature, structural formulas, stereochemistry, bonding, reaction mechanisms, and chemical transformations of functional groups. Completion of the course should make students more confident in their chemical background when entering college biology or chemistry courses.

ADVANCED TOPICS IN CHEMISTRY (SPRING) Monday / Thursday, 2:30–3:30pm Grade Level: 11-12

Prerequisite: Chemistry

Instructor: Jocelyn Rodgers, Ph.D., Maret School, Washington, DC

This semester course explores aspects of chemistry that are often skimmed over or omitted in most chemistry courses—chemical applications and the history of chemistry. Real-world applications abound in areas such as nuclear, medical, atmospheric, industrial, food, water, and consumer product chemistry. We will begin with an exploration of energy sources such as nuclear power, solar power, and lithium ion batteries. We will then explore computing—both the properties of the elements that power the computers we use every day as well as computational techniques that have revolutionized the ability of scientists and students to visualize and understand chemical processes at a molecular level. Throughout the semester, we also explore the history and life events of scientists who discovered the chemical elements and have impacted the history of the world through chemistry. In independent projects, students will explore the periodic table for daily applications and

technologies, from cell phones to photovoltaic cells to medical treatments. This course will be heavy in applications and theory, with less of the traditional problem-solving found in other courses.

A MATHEMATICAL MODELING APPROACH TO SOCIAL JUSTICE (SPRING) Tuesday / Thursday,
4:40–5:40pm Grade Level: 11-12 Prerequisite: Precalculus (prior or concurrent)
Instructor: Jay Noland, Mounds Park Academy, St. Paul, MN

The main purpose of this course is an introduction to mathematical modeling through graphical, numerical, symbolic, and verbal techniques. We will focus on data from and explore social justice issues such as the Wealth Gap, Achievement Gap, Climate Change and others. We will use elementary functions (polynomial, exponential, logarithmic, etc.) to build models and address questions with the goal of developing scientific reasoning and problem-solving skills. Students will also use technology in a range of ways to effectively communicate their hypotheses and conclusions.