

**WESTERN RESERVE ACADEMY
ACADEMIC COURSE
DESCRIPTIONS
2021-2022 SCHOOL YEAR**



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ALL COURSES 2021-22

ENGLISH

Foundations of Text
Explorations of Analysis
Angles in Writing
Studies in English: Detective Fiction
Studies in English: Graphic Novels
Studies in English: A Few of My Favorite Things
Studies in English: American Nature Writing & Environmental Issues
Studies in English: Identity Crisis: When Cultures Clash →
Studies in English: Film Studies: A Baker's Dozen
Studies in English: Creative Writing: Fiction & Playwriting
Studies in English: Creative Writing: Nonfiction & Memoir
Studies in English: YA Fiction
Studies in English: Contemporary Native American Voices
Studies in English: Boarding School Literature
Studies in English: Ethnic Studies
Studies in English: Social Justice in Literature
Studies in English: Contemporary Fiction
CL English: Graphic Novels
CL English: Shakespearean Lenses
CL English: Writing Memory
CL English: Power of Language
CL English: Deep Dive
CL English: Out of India: Literature from the Diaspora

FINE & PERFORMING ARTS

Art
Art II
3D Art
Ceramics
Environmental Art
Studio Art
Advanced Studio Art
Photography
Costume Design
Book Arts and Printmaking
Dance
Honors Dance
Choir
String Orchestra
Symphonic Winds
CL Music Theory

Studio Music
Jazz Ensemble
Digital Music Production
Acting for the Stage
Advanced Acting
Stagecraft

INTEGRATED STUDIES & DESIGN

Learn to Code
Learn to Make
Learn to Live Well
Learn to College
CL Compass
Automotive Engineering Design
Engineering and Fabrication
Advanced Engineering and Fabrication
Mechanical Engineering
CL Fab Academy
Graphic Design and Illustration
3D Printing and Design
E-textiles and Fabrics
Artificial Intelligence and Machine Learning
Idea to Product: How to Start a Business
Digital Video Editing and Effects
Architectural Restoration
Digital Fabrication Capstone
Service-Learning Engineering
Disruptive Ideas →
Speech
Applied Positive Psychology
Principles of Athletic Training
Advanced Principles of Athletic Training
Mission in Action
The Evolution and Impact of Advertising

MATHEMATICS

Math 11 Algebraic Reasoning
Math 15 Algebraic Concepts & Applications
Math 20 Algebraic Reasoning
Math 21 Geometric Reasoning
Math 22 Honors Geometric Reasoning
Math 31 Algebraic Reasoning II
Math 32 Honors Algebraic Reasoning II
Introduction to Data Science
Discrete Mathematics
Financial Mathematics
Computer Programming: Python
Precalculus

→ indicates course will not be offered in the 2021-2022 school year

ALL COURSES 2021-22

Honors Precalculus AB
Accelerated Precalculus BC
CL Statistics: Epidemiology
CL Computer Science
Calculus Semester 1
Calculus Semester 2
CL Calculus AB
CL Calculus BC
CL Calculus-based Probability & Statistics
CL Multivariable Calculus
CL Linear Algebra

MODERN & CLASSICAL LANGUAGES

French 1
French 2
French 3
Honors French 3
French Language & Culture
CL French Language & Culture
Latin 1
Latin 2
Latin 3
Honors Latin 3
Latin Literature
CL Latin Literature
Mandarin Chinese 1
Mandarin Chinese 2
Mandarin Chinese 3
Chinese Language & Culture
CL Mandarin Chinese
Spanish 1
Spanish 2
Honors Spanish 2
Spanish 3
Honors Spanish 3
Spanish Language & Culture
CL Spanish - Spain/Latin America
Ancient Greek →
Introduction to German →

SCIENCE

Biology
Chemistry
Honors Chemistry
Experimental Physics
Physics
Honors Physics

CL Microbiology
CL Pathobiology of Human Disease
CL Chemistry
CL Physics
CL Quantum Mechanics
Biotechnology
Cancer Immunology 1
Cancer Immunology 2
Cancer Immunology 3
Cancer Informatics →
Ecological Sustainability →
Astronomy
Advanced Astronomy
Exercise Physiology
CL Synthetic Biology 1 and 2
Ocean Topics

SOCIAL SCIENCE

Exploring Global Foundations
Building the Modern World
United States History and Government
CL United States History and Government
Introduction to Arabic and Arab Cultures
Art History: Raphael to Renoir →
Art History: Paint, Build, Shoot! →
CL Art History →
CL Economics
CL US Government & Politics →
Space Race-Fighting Cold War on New Frontier
Vietnam: Humbling a Superpower
American Presidency
History of the US Civil Rights Movement: Marching
Towards Justice
CL Philosophy
Global Health
Global Mental Health
Native American Heritage & Culture
History of Hudson and WRA
East Asian History
Introduction to Geography
Introduction to Geographic Information Systems
Music History

COLLEGE LEVEL COURSES 2021-22

ENGLISH

Graphic Novels
Shakespearean Lenses
Writing Memory
Power of Language
Deep Dive
Out of India: Literature from the Diaspora

FINE & PERFORMING ARTS

Music Theory

INTEGRATED STUDIES & DESIGN

Compass
Fab Academy

MATHEMATICS

Computer Science
Calculus AB
Calculus BC
Epidemiology
Calculus Based Probability & Statistics
Multivariable Calculus
Linear Algebra

MODERN & CLASSICAL LANGUAGES

French Language & Culture
Latin Literature
Mandarin Chinese
Spanish - Spain/Latin America

SCIENCE

Microbiology
Pathobiology of Human Disease
Chemistry
Physics
Quantum Mechanics
Synthetic Biology 1 and 2

SOCIAL SCIENCE

United States History and Government
Art History
Economics
US Government & Politics
Philosophy

COURSE DESCRIPTIONS

ENGLISH

Foundations of Text (1.0 Credit): Open to freshmen and sophomores, this course introduces students to the study of composition and literature at WRA. The focus of this class is primarily on texts in written form; however, students will engage in various modes of storytelling in an effort to learn and solidify reading and discussion strategies. Teachers encourage and promote active reading, including but not limited to paying attention to details and recognizing how those details contribute to the overall story. In connection, this class emphasizes effective annotation, class discussion, textual analysis, and thematic and esthetic appreciation. Writing instruction is centered on grammar, compelling statements, and logical development — all in the context of students' own expository paragraphs (exemplification, definition, classification and division, comparison and contrast). Students write a short composition most weeks of each semester; moreover, they engage in the writing process, including revision. In the spring, students take a common grammar assessment that tests their mastery of language skills covered over the course of the year.

Explorations in Analysis (1.0 Credit): Open to sophomores and juniors, this course emphasizes various techniques and approaches for exploring and discussing literature. Students will learn how to engage with the text, discern meaning, formulate an argument, and present their argument in clear and constructive ways. Building on skills that were taught in Foundations of Text, students will continue to work on developing their close reading and discussion skills, while also strengthening their ability to develop, coordinate, and organize their ideas. Students submit an essay every two to three weeks, and most assignments challenge students to present analyses of the literary text under consideration. Readings and explorations include (but are not limited to): human fallibility and resilience; identity; freedom and confinement; the power of language; and memoir and storytelling. Students develop the vocabulary to handle the course's increasing literary and rhetorical sophistication. In the spring, students take a common grammar and style assessment that tests their mastery of writing skills covered over the course of the year.

Angles in Writing (1.0 Credit): Open to juniors, new seniors, and post-graduates, this course emphasizes a variety of approaches to critical thinking and effective communication. All aspects of Angles in Writing revolve around the choices authors make and on the value/impact those choices have on the text. Readings feature notable works in fiction, nonfiction, and poetry that underscore and examine the frame of the storyteller/speaker. Throughout the year, students will learn various strategies for exploring, analyzing, and discussing perspective and bias, and they will be challenged to share and present their findings in scholarly and academic ways. They study style and vocabulary to enhance their written and spoken expression of ideas. In the first semester, students write an essay — mainly expository in nature — every two to three weeks. At midyear, students participate in the Junior Writing Exam (JWE - an analytical essay written about a work of prose or poetry), and then progress to more independent engagement with the presented texts ending with a written project. Students are required to pass the JWE in order to graduate from WRA.

STUDIES IN ENGLISH

These offerings are designed for returning seniors. The department offers several half-year electives,

giving students a choice of an array of writing, writers, texts, and themes (seniors must enroll in English both semesters in order to graduate). Teachers design offerings that present compelling perspectives on the human experience and on writing in the world. Each of these electives will foster attentive reading, engaged discussion, critical analysis, and other forms of composition. Moreover, students will gain experience with other forums for the presentation of their ideas about literature.

Detective Fiction (.5 Credit): A Hard-Boiled Study of Sleuthing and Storytelling. This course is an exploration of the development of and alteration to the genre of detective fiction. Most interesting will be studying the origins, techniques, and characterizations that have made this one of the world's most read forms of literature. In this course, students will read, analyze, and respond to the texts often and in different ways. This is not a course for the faint of heart; murder and the human heart can be messy, disturbing, and often grotesque. Students will examine archetypes like Dupin, Holmes, Spade, and Marlowe, and will explore the seedier side of human nature and detecting. Potential texts: *Murders in the Rue Morgue*, Edgar Allan Poe; old-time radio programs; *The Sherlockian*, Graham Moore; Sherlock Holmes stories; Sir Arthur Conan Doyle; and *LA Confidential*, James Ellroy. Also open to sophomores with departmental permission.

Graphic Novels (.5 Credit): "Comics are just words and pictures. You can do anything with words and pictures." These words spoken by underground comic Harvey Pekar convey a poetic truth about one of the most influential yet misunderstood forms of literature: the graphic novel. In this course, students will read both contemporary and classic graphic novels while exploring the history of the form, its cultural significance, and the creative techniques graphic novel writers use to captivate audiences. In addition to reading graphic stories, students will have the opportunity to create pieces of their own and get feedback from their peers in the form of roundtable workshops. As a class, students will learn about the evolution of this genre and how it has been used to confront and examine various aspects of the human experience: politics, sexuality, class, censorship, violence, diversity, and more. Students can expect daily reading quizzes, several analytical essays, along with many opportunities for creative writing and graphic storytelling. Also open to sophomores with departmental permission.

A Few of My Favorite Things (.5 Credit): This course focuses on novels selected by WRA's most senior faculty member. There is nothing thematically holding these together; they're simply really good stories and respected pieces of literature. All of the novels have been turned into films and thus upon completion of a novel, students will watch and discuss the associated film. Ultimately, the goal is to examine a number of pieces and to engage in thoughtful conversation about the texts and the issues they raise while having some fun along the way. An emphasis will be placed on class discourse. Texts are *The Reluctant Fundamentalist*, Mohsin Hamid; *Shoeless Joe*, W.P. Kinsella; *The Road*, Cormac McCarthy; *Deliverance*, James Dickey.

American Nature Writing & Environmental Issues (.5 Credit): This course attempts to explore the natural world and our relationship with it. There will be two types of nonfiction readings for this class. One will be what is known as "nature writing," which are personal essays that explore the natural world for truths that apply to our lives. This style encourages students to evaluate their individual definition of nature and to think carefully about what they can learn from our natural surroundings. The other type of reading can sometimes be emotionally charged and will deal with ethical issues related to our natural world. These essays tend to be expository in style and will hopefully help us better understand the political and cultural pressures which can influence our natural world and us. Writing will be exclusively personal in form, and students will have the opportunity to address issues raised through class and to practice nature writing itself. Additionally, throughout the course students will research an ethical issue with personal meaning, presenting their findings at the end of the course. Also open to juniors with departmental permission.

Identity Crisis: When Cultures Clash (.5 Credit): Jung famously described the shadow that lives within us, a dark force confusing our desires and influencing how we act upon them. But light and dark never cleanly align with good and bad; the line between is blurry, always shifting, and sometimes

disappears altogether. This course begins with the prototypical tale of one man torn between the push-and-pull of identity formation: Batman. From there, we turn to characters who feel culturally dislocated. Both real and imagined, our characters cannot make sense of the chaos around and especially within. Our subjects feel alienated from the past and constantly grapple with the present. They have no idea where they belong in the future. Literally and figuratively, they have been removed from home. They were from Vietnam, Pakistan, Mexico, Jamaica, or Iran before they (or their parents) were here. Or, like Qoyowayma, they (and their ancestors) were here, far before any of us were. Questions guiding our inquiry: How does shared history inform our understanding of who we are? What happens at sites of cultural collision? What is lost? Gained? Changed? And, how do uneven dynamics of power factor into cultural confusion and its aftermath? Texts: *The Dark Knight Returns* (Miller); *On Earth We're Briefly Gorgeous* (Vuong); *White Teeth* (Smith); *No Turning Back: A Hopi Indian Woman's Struggle to Live in Two Worlds* (Qoyowayma); *Persepolis* (Satrapi).

Film Studies: A Baker's Dozen (.5 Credit): Whether students consider themselves a cinephile or they just like to watch movies, chances are that knowing more about film history and craft would heighten their viewing experience. While this course makes no pretense of providing students with a comprehensive purview of either, it does seek to introduce them to some of the most game-changing movies of all time. Looking at 13 films across the span of almost 100 years, students will learn to "read" film as text. Expect to develop a working knowledge of film's formal features (e.g. genre, mise-en-scène, cinematography, performance, sound, editing, and of course, narrative). Expect to dabble in major theories about consuming moving pictures. And expect to appreciate why auteurs like Charlie Chaplin, Marlon Brando, and Alfred Hitchcock persist in our cultural capital. The final project is an opportunity to delve into subtopics like queer cinema, media studies, and real-time broadcasting. Texts: *Metropolis* (Fritz Lang, 1927); *Modern Times* (Charlie Chaplin, 1936); *Casablanca* (Michael Curtiz, 1942); *Rashomon* (Akira Kurosawa, 1950); *West Side Story* (Robert Wise and Jerome Robbins, 1952); *The Birds* (Alfred Hitchcock, 1963); *Apocalypse Now* (Francis Ford Coppola, 1979); *The Shining* (Stanley Kubrick, 1980); *The Thin Blue Line* (Errol Morris, 1988); *Goodfellas* (Martin Scorsese, 1990); *Rushmore* (Wes Anderson, 1999); *Spirited Away* (Hayao Miyazaki and Kirk Wise, 2001); *Water* (Deepa Mehta, 2005). Also open to sophomores and juniors with departmental permission.

Creative Writing: Fiction & Playwriting (.5 Credit): This course is an exciting introduction to the basic elements of fiction and playwriting, with in-class writing, take-home reading and writing assignments, and substantive discussions of craft. Students produce, experiment, and react to a range of creative forms as a means of developing different imaginative approaches to experience. The emphasis will be on generating raw material specific to short stories and playwriting, in getting familiar with some of the essential strategies for reading and discussing the writing of others, and in understanding and recognizing the techniques and tools of effective writing and editing. Throughout the semester, classes will be structured as a workshop -- where students receive feedback from both the instructor and their fellow writers in a roundtable setting, and they should be prepared to offer their classmates responses to their work. To ground our study, students will be expected to read 1-2 full-length collection(s) of short stories (selections change yearly). For the course final, students are required to submit for publication a polished work of any genre.

Creative Writing: Nonfiction & Memoir (.5 Credit): In this introductory creative writing class, students produce, experiment with, and react to a range of creative forms as a means of developing different imaginative approaches to experience. In this course, students will focus on both reading and writing non-fiction pieces. Students will share their work with their peers in weekly workshops and will get familiar with essential strategies for revising and improving their work as well as essential strategies for reading and discussing the writing of others. This course will focus heavily on the workshop model helping students build their understanding of the techniques and tools of effective writing and editing. To ground our study, students will be expected to read and analyze many pieces of non-fiction throughout the course. For the final, students are required to submit a polished piece for publication.

YA Fiction (.5 Credit): It seems appropriate and significant to study the magic of literature meant to inspire a lifetime of adventures in reading. In some academic circles, Young Adult fiction is undervalued and unfairly criticized for what can be deemed “simplistic” storylines or wide popularity. There is so much more to be cherished and valued in this genre for young and old alike. This course will examine the art of storytelling in a few of these gems, helping students to see the deeper meaning and value in books geared toward and for the teenage mind. This type of literature is worthy of analysis and exploration just as the classics found in the canon are as both add to the study of writing, reading, and life. I have selected a few texts to inspire both thoughtful and careful study during this elective. There are frequent reading quizzes and discussions. A willingness to think outside of one’s comfort zone and to invest in the subject matter is a MUST.

Contemporary Native American Voices (.5 Credit): This course emphasizes contemporary Native American voices. It argues that Native American voices—in both fiction & nonfiction—offer a unique perspective among English language works. By examining works by such thinkers as Tommy Orange, Joshua Whitehead, Joy Harjo, and Louise Erdrich, students will consider two important lines of inquiry. First, students will discuss how indigenous author’s use the “invaders language” to subvert & recreate the meanings derived from the English language. Second, students will study how indigenous voices examine, formulate and develop the fabric of indigenous identity. As David Treuer correctly notes, “so called Native American fiction has not been studied, as *literature*, as much as it should be.” In a small way, this class intends to begin remedying that rightful critique by providing Native American literature the close reading it deserves. Following our study of contemporary voices, students will offer a rhetorical critique of a current issue facing NDN peoples and culture. By analyzing the language of Native American voices—rather than what is said about Native American voices—students will come to better understand how a mascot, skin tone, or geographical area becomes imbued with meaning. Through seminar discussion and argumentative writing, the class will enter into lively discourse, interrogating these meanings, as they explore and argue about how each of them mold an identity within the context of their lives. Open to juniors, seniors and post-graduates.

Boarding School Literature (.5 Credit): Attending a boarding school is a unique and complicated experience. In examining various representations of this education model (literature, movie, media, and more) on these majestic campuses, students will begin to determine if the voices and travails are authentic to the real-life setting of Western Reserve Academy. Through analysis, discussion, and exploration, each representation will be dissected and assessed for its development of characters, conflicts, social awareness, and authenticity. In addition to literary representations, there will be guest speakers from all different areas of the boarding school life, students will examine the changes over the years with both alums and former and current teachers. Students will celebrate the art of storytelling in the context of this institution and others. Along with these exciting aspects, students will watch different representations of schools both in the media and in the entertainment industry. Students will digest information, compare perspectives, and discuss their own legacy here at Reserve. What does one want to leave behind at a place steeped in history and formative moments? What can be learned from our predecessors and bequeathed to future Pioneers? This will be the journey students take together as they explore the boarding school world.

Ethnic Studies (.5 Credit): In this course, students will study how intersecting notions of identity manifest themselves in American literature and how literature has helped to both reflect or shape notions they hold regarding race, class, gender, etc. In reading literature by key authors such as Virginia Woolf and James Baldwin, students will examine how definitions, expectations, and social norms regarding various aspects of identity have evolved over time and look at how modern authors are using literature to continue pushing important conversations about identity forward.

Social Justice in Literature (.5 Credit): This course will focus on the impact of literature on social justice issues throughout history to the modern day. Students will explore questions ranging from: How is literature distinctive in the ways we grapple with questions surrounding social justice? How does literature reinforce or challenge dominant perspectives? How can literature create practices

that allow the reader to imagine different demographics flourishing and adapting rather than just surviving? How do literary works influence a reader's emotions that might promote or undermine social justice? How can literature impact social justice movements? A range of reading, writing, and discussion-based learning will be employed to develop a deeper understanding of a diverse set of social justice issues such as capitalism, addiction, homelessness, exploitation, poverty, racism, women's rights, health care, criminal justice system, etc. At the end of this course, students will be able to utilize their skills and understanding to facilitate change in social justice areas they are passionate about. Students will show mastery by reading a chosen text and presenting on the history of the social justice issue presented along with how the text addresses said issues and/or has facilitated social change (or could be used to facilitate social change).

Contemporary Fiction (.5 Credit): In the lineage of Book History, reading stories have brought communities together. Novel reading, in particular, has long been a middle class pastime. Even in the age of streaming services and social media entertainment, the printed word persists. This is because aside from lived experience, nothing teaches so much about the world as reading. You would be hard-pressed to find an English teacher without the fundamental wish for her students to be lifelong readers. In this spirit, students in this course seek to understand the contemporary moment by reading contemporary stories. With curiosity for the writing craft, with appreciation for the trueness of fiction, and with the compassion to "listen" to wildly different truths: students delve into other people's stories. Potential texts are curated from award-winning selections published in 2015 or thereafter. The shortlist shall be decided upon by student vote. Possible Texts: *Your House Will Pay: A Novel* (Cha); *Outline* (Cusk); *Less* (Greer); *Hamnet* (O'Farrell); *Recursion* (Crouch); *Pet* (Emezi); *Mexican Gothic* (Moreno-Garcia); *Beautiful World, Where Are You?* (Rooney).

COLLEGE LEVEL COURSES IN LITERATURE, COMPOSITION AND RHETORIC

College Level (CL) courses are designed to challenge and engage the most proficient and passionate WRA English students at the college level by exploring literature, composition, and rhetoric on deep and profound levels. All CL offerings will engage a range of literary expression—from fiction to poetry to nonfiction to text in performance—and assume facility with literary and rhetorical terms. The creativity, research, and synthesis necessary for such exploration will demand that students go well beyond the conventions of standard literary essays. Students will write in a variety of modes, including argumentative, reflective, and persuasive forms. Independence and initiative are essential (and assumed) for success in this course. Students—having demonstrated a serious commitment to and interest in the advanced study of English—wishing to enroll in the CL courses must have earned the recommendation from their teacher in Angles in Writing. Students who are not initially recommended may petition with the English department chair and current teacher to register for the course.

Graphic Novels (.5 Credit): Question: Whose good idea was it to include a class about comics in the WRA course catalogue? Answer: All of the English teachers! As readers and writers of stories, we know that words and pictures are nothing more than marks and lines on pages meant to communicate. This course examines call and response between writers and readers of comics, or what more rarefied circles call "graphic novels." Our point of departure is Scott McCloud's critical work, *Understanding Comics*. Having versed ourselves in grammatical code, students explore the flexibility of the graphic novel by reading from an array of genres, including memoir, historical fiction, realistic fiction, journalism, and allegory. Topics cover everything from social justice, to teenage angst, to the quotidian, to superherodom. The final allows for comics making, or a deep dive into a particular author, genre, or subject matter. Prepare to think of comics in a whole new way. *Understanding Comics* (McCloud); *The Dark Knight Returns* (Miller, et al.); *Persepolis* (Satrapi) *March* (Lewis, et al.); *Paying the Land* (Sacco); *Black Hole* (Burns); *Jimmy Corrigan: Smartest Kid on Earth* (Ware); *Blankets* (Thompson).

Shakespearean Lenses (.5 Credit): Shakespeare's cultural position--"the Bard"--is as undeniable as it is maddening. Shakespeare, after all, was a real person whose plays were never written to be "not of an age but for all time." But they have become just that, and therefore this class will ask two

questions: Why do we have (this) Shakespeare? And what do we do with him since we have got him? Students will attempt to understand Shakespeare in his time and place, historicizing him and his works theatrically, culturally, and politically. Students will also use Shakespeare to think about our own world, reading his works through various interpretive lenses such as queer theory, feminist theory, ecocriticism, historical materialism, textual criticism, and political theory. The ultimate goal of the class is to introduce students to the work that professional literary scholars and historians do, and to give them experience doing the kind of literary investigation they will be asked to do in college Shakespeare classes. Possible texts include: *Shakespeare's sonnets* (selection), *A Midsummer Night's Dream*, *Richard II*, *King Lear*, and *Antony and Cleopatra*.

Writing Memory (.5 Credit): Years from now, what will you say about teenage life in the time of quarantine? Novelist and activist Arundhati Roy recently described this historical moment as a “portal” between what once was, and what will be. Do you agree? This course considers how memory shapes our understanding of ourselves and the world around us. We cradle sweet memories and we mull over sad memories. Either way, memory can be hard to quit. And while it is often productive to not forget, to learn from what has happened in a particular place at a particular time, memory is not infallible. Like tattoos, we etch memories with a false sense of permanence, and are dismayed to find they fade and stretch. Our class will read personal essays, memoir, and even fiction in the interest of writing the same. Students will investigate why and how much memory matters -- to you, to me, to everyone. As a CL student, expect to read and write in abundance. Texts: *Autobiographical Digression #3: Why We Write* (Markley); *Heroin/e* (Strayed); *No Name Woman* (Hong Kingston); *Twelve Words* (Trapp); *The Sense of an Ending* (Barnes); *My Father's Brain* (Franzen); *On Earth We're Briefly Gorgeous* (Vuong).

Power of Language (.5 Credit): This course explores the role language plays in the creation of ourselves and our societies, how language reinforces our conceptual understanding of the perceivable world, and how effective rhetoric can alter, reinforce or remake those understandings. If, as George Orwell flatly stated, language corrupts thought, how does the English language manifest and reinforce those meanings we derive? By examining nonfiction work by such thinkers as Louis Althusser, James Baldwin, George Lakoff, Toni Morrison & Ngũgĩ wa Thiong'o, students will explore how language formulates ideas and institutions. Following our theoretical study, students will learn to act as effective rhetoricians. Within the framework of the American Civil Rights Movement, students will listen and read powerful uses of language, such as *The Autobiography of Malcolm X*, before moving to more contemporary questions. By analyzing how language is used in everyday life, students may come to better understand how a flag, statue or monument becomes imbued with meaning. Through class discussion and argumentative essay writing, our class will enter into a lively and analytical discussion on these topics.

Deep Dive (.5 Credit): This class will take it slow. Where most English classes end up being a sprint through multiple texts, students are going to read one book for an entire semester. The goal is to get to know that book as intimately and thoroughly as possible, to examine it from all sorts of angles, to allow the opportunity to truly understand it, and to allow it the opportunity to change us. As students go along, they will read a large number of related texts, including historical documents, philosophical writings, critical essays; students will place the book in the artistic and historical context of its setting and of its writing. So while they will “only” be reading one novel in this semester, students will also be learning about a whole world, whole new ways of looking at that world and our own; students will practice the arts of concentration and taking care. Our methods will be diverse and interdisciplinary, but our aim will be simple: to know, to feel, to connect. The core text for this year will be Marilynne Robinson's *Gilead*; supplemental readings will include theologians and philosophers like Feuerbach, Calvin, Barth, and Hegel; the *Bible*; James Baldwin; a variety of slave narratives, spirituals, and abolitionist tracts; and more. Students will also (hopefully!) visit places in the Hudson area that have connections to John Brown and the Underground Railroad, and discuss religion in America and the Midwest with local ministers. Students will have freedom to create their own responses, written and otherwise, to the various topics the book raises and the feelings it inspires; assignments will range from the critical to the creative and may involve traditional essays, visual art, creative writing, film,

audio, and more.

Out of India: Literature from the Diaspora (.5 Credit): Indian-born and “of Indian descent” at the least are two different ball games. But whether swinging the cricket bat or the baseball bat, to be Indian is to be Indian ... right? According to whom? “ABCD” stands for “American-Born Confused Desi” -- a label itself fabricated in ambivalence. This CL course takes on the enormous task of reading about the experiences of “ABCDs” and other people with ties to the Subcontinent. Our inquiry stays within the bounds of literature conceived in the English. Thus, students begin by discussing the power structures implicit within those limits. Our ambitious reading selections come out of India. Students disperse around the globe to visit Mumbai, London, New York, Columbo, Addis Ababa, Vancouver, and even a fictional island community in the Carribean. Through the stories and their characters, students will come to appreciate the vastness of Indian identity. Possible Texts: *Midnight’s Children* (Rushdie); *Cutting the Stone* (Vergheze); *Homeland Elegies: A Novel* (Akhtar); *The God of Small Things* (Roy); *Running in the Family* (Ondaatje); *Interpreter of Maladies* (Lahira); *Good Talk* (Jacobs); *He Drown She in the Sea* (Mootoo). Films: *My Beautiful Launderette* (Frears/Kureishi); *Bend it Like Beckham* (Chadha).

FINE & PERFORMING ARTS

VISUAL ARTS

Art (.5 Credit): Introduces students to color theory, drawing skills and both wet and dry mediums. The process of learning how to create an art proposal before starting a project will be fostered. Throughout this course students will be presented with different mediums to explore and the opportunity to further their skill set within these mediums. The process of critique will be discussed and explored. Sketchbook required.

Art II (.5 Credit): Students will build upon the foundation they have gained in Art, and utilize this knowledge base to further develop their skills in drawing, painting, printmaking, and/or collage. This class will emphasize the importance of the implementation of the art proposal. More of a self guided class- students focus on what they are passionate about and really get into it. Sketchbook required. Prerequisite: Art I and/or departmental permission.

3D Art (.5 Credit): The 3D art student will be introduced to the following materials but not limited to: wire, a variety of woods (balsa wood and toothpicks due to space), papers, cardboard, found objects, and recycled materials to name a few. Students will learn from direct observation and use these materials to show their understanding of the Principles of Design: Pattern, Contrast, Emphasis, Balance, Proportion, Harmony (unity) and Rhythm and Movement.

Ceramics (.5 Credit): This class will take a look into the fundamental techniques used to create pieces out of clay including handbuilding, wheel throwing, carving, and wedging. As well as experimenting with different surface treatments to acquire the desired look including glaze testing, and firing. Students will also be talking about the pieces made in a critique setting as a class, this way students learn how to talk about their artwork and explain their ideas. This class is for students who want to explore the medium and what they can do using clay.

Environmental Art (.5 Credit): Students will use the outdoors as their canvas. Using different natural materials students will create installations indoors and outdoors. The elements and passage of time change and these art forms. Students must be prepared to work in the elements. Rain boots, rain/warm coats, and gloves are all required. Sketchbook required.

Studio Art/Advanced Studio Art (.5 Credit): This course requires substantial commitment and a willingness to explore new ideas and the ability to express personal artistic vision. Students enrolled in this class are seeking opportunities to further their art education after WRA at the collegiate level or are deemed appropriate by instructors and have shown considerable growth, drive and commitment in the art studio previously. Sketchbook required. Prerequisite: Art and Art II or departmental permission.

Photography (.5 Credit): Students will learn the basics of capturing images using DSLR cameras, and smartphones to control focus, shutter speed, and composition. Post-processing, and photo manipulation will take place in Adobe Lightroom and Adobe Photoshop to create both realistic and artistic effects. Students will delve into idea development, design implementation, technical skills, creative risk-taking, and personal expression. Prerequisite: Art I and permission of the instructor. This course may be repeated for credit.

Costume Design (.5 Credit): Students will learn the elements of costuming including organization, design, and construction. Focus is on preparing for theatrical productions, including script analysis and historical research. Students will learn how to cut and alter a pattern, operate a sewing machine, and adjust existing garments. Students will also assist in getting costumes ready for theater and dance performances. More

advanced students may be involved in the design and construction of costumes for the stage. This course may be repeated for credit.

Book Arts and Printmaking (.5 Credit): With the written word so available and easy to spread via the internet, artists have co-opted the now obsolete tools of the craftsman to create artist books and book-like structures. Students in this class will not only employ traditional tools to make prints, they will also learn adhesive and non-adhesive bindings, as well as create original book structures, tapping into their own personal ideas. This class is great for those who want to add to their art skills, but also for those who are interested in creative writing, sequential imagery, lettering, graphic arts, or journaling. This course may be repeated for credit.

DANCE

Dance (1.0 Credit): This course is for students who have no, minimal or intermediate dance experience. Dance is a performance art that incorporates mind and body. It takes discipline, dedication and hard work. The main focus of the course will be technique, which gives students a strong foundation for dance. Students will be given the opportunity to work on their technique in the areas of ballet, modern, jazz and hip hop. There will also be opportunities to experience other forms of dance such as tap and contemporary. While studying technique, the learning, understanding and practice of dance vocabulary is stressed. Students are required to participate in two performances, which are at the end of the first and second semesters. Over the course of the year, students will study other areas of educational dance such as kinesiology, history, composition and how to analyze/critique.

Honors Dance (1.0 Credit): Students must audition prior to enrolling in this course, which is a full-year course. Honors Dance is for students with substantial dance experience, which includes strong technical ability and training in the areas of ballet, modern and jazz. Dance is a performing art that incorporates both mind and body. It takes discipline, dedication, and hard work. The main focus of the course will be technique, which gives students a strong foundation for dance. Students will be given the opportunity to work on their technique in the areas of ballet, modern, jazz and hip hop. There will also be opportunities to experience other forms of dance such as pointe, tap and contemporary. While studying technique, the learning, understanding and practice of dance vocabulary is stressed. Students are required to participate in the two performances, which are at the end of the first and second semesters. Over the course of the year, students will study other areas of educational dance such as kinesiology, history, composition and how to analyze/critique.

MUSIC

Music students find ample opportunity for the study and performance of music at all levels at Western Reserve Academy. Courses are offered in choir, string orchestra, symphonic winds, music theory, studio music, jazz ensemble and digital music production. Students may elect to take our performance courses — choir, string orchestra and symphonic winds — repeatedly for credit and are strongly encouraged to do so.

Choir (1.0 Credit): The Academy Choir is WRA's traditional mixed chorus and is open to all students regardless of level of experience. While emphasis is placed on developing vocal skills and independent music reading, the primary focus of this group is performance. The choir performs music of many style periods and genres and is particularly proud of its history of multicultural works. Performance opportunities include a mid-winter Madrigal Feast, Vespers, a major work with chamber orchestra, singing at numerous WRA events and occasional off-campus opportunities. Students seeking a more selective opportunity may also audition for Chamber Choir and/or unReserved, our a cappella group.

String Orchestra (1.0 Credit): The Academy String Orchestra brings together students who play violin, viola, cello and bass. The ensemble primarily plays classical repertoire for string orchestra, occasionally combining with members of Symphonic Winds to play music written for full orchestra. String players will also have the opportunity to play chamber music and partner with The Academy Choir.

Symphonic Winds (1.0 Credit): The Reserve Symphonic Winds is WRA's ensemble for students who play brass, woodwinds or percussion instruments. This group plays standard concert band repertoire as well as occasionally working in jazz or contemporary music. Band members will also have the opportunity to participate in small ensembles and pep band. WRA has a small cadre of instruments for students who may not have their own. While most members have prior experience, it is never too late to learn!

CL Music Theory (1.0 Credit): This course is intended to help students master the tools necessary for understanding the building blocks of music; they will gain fundamental understanding in musical notation, rhythm and meter, scales and chords. Some prior music experience (playing an instrument or singing) is helpful; students will gain expertise in active listening and do some composing as well as focusing on building aural skills. During the second half of the year, the focus will be on extensive work in harmonic analysis and writing music using the rules of the Common Practice Period.

Studio Music (.5 Credit): Open to serious musicians looking to develop their skills and explore performance in a sophisticated way. Students will work on repertoire illustrative of developing excellence in their particular instrument/voice. Students must be able to practice independently and will be expected to demonstrate exemplary progress towards their targeted goals through performance. A final program/recital to showcase progress will be expected during each semester of participation. Prerequisite: Departmental permission and demonstrated expertise via audition or participation in WRA's ensembles.

Jazz Ensemble (1.0 Credit): This course is offered to students who want to develop and grow in their performance and understanding of jazz. Instrumentation is limited to those in a standard jazz ensemble: saxophones, trumpets, trombones, percussion, keyboards and guitars. Band members will learn advanced scales, sight-reading and elements of jazz theory. Band Members will perform varying styles of Jazz Literature that will include swing, bebop, big band, blues, Dixieland, funk, pop, rock, gospel, fusion and multi-ethnic repertoire. This is a performance-based ensemble, where concerts take place in the evening and perhaps on weekends.

Digital Music Production (.5 Credit): This course will introduce students to the realm of music production and the necessary skills needed in this digital age. The focus of this course will be honing students' ability to listen and analyze professional productions, ranging from Michael Jackson to Randy Newman to Avicii. Topics covered will include stereo processing, analogue and digital processing, compression, limiting, filtering, panning, reverb, and EQ. Mixing and creating a final mastered product will provide students the ability to actualize the different components in producing commercial level music. All D.A.W.'s (Digital Audio Workstations) will be explored with the main use of Apple's Logic Pro. Both live streams, D.A.W.'s, and production courses will be made available to the students.

THEATER

Acting for the Stage (.5 Credit): This course uses both improvisational work and scene study to teach the student-actors how to effectively prepare for and perform a theatrical role. It introduces the basic idea of acting being grounded in utilizing an individual's inner and outer resources. Coursework will focus on the same characterization development as explored in Stanislavski's method of physical action. The course is also grounded in textual analysis and the development of certain physical techniques to create a character.

Advanced Acting (.5 Credit): This course in acting will use scene study as the principal vehicle by which to continue exploring and expanding upon the concepts and methods introduced in Acting for the Stage. Using contemporary methodologies and eclectic techniques, such as the Uta Hagen and Stanislavski methods, direction and guidance will be individualized and based on the needs of each individual student actor. Depending on the number and attributes of the students enrolled in the course, there may also be a segment devoted to ensemble acting--a student driven performance of a chosen one act play that would incorporate the entire class. This course will provide a place for those students who would like to experience a more intensive, serious approach to learning the craft of acting. Prerequisite: Acting for the Stage or departmental approval (audition).

Stagecraft (.5 Credit): This course blends theory with practice regarding the technical aspects of live events, and provides an opportunity to learn skills in carpentry, painting, lighting, sound, shop safety and design techniques. Students will explore the similarities and differences of mounting and enhancing performances of theatre, dance and music, and then experience these distinctions first hand as they help prepare for events in the Knight Fine Arts Center.

INTEGRATED STUDIES & DESIGN

Learn to Code (.5 Credit): While exploring the digital world, students learn how data is digitally encoded and transmitted. They deepen their understanding of the internet and the underlying structure of digital devices. Students consider the power of current technology and the possibilities for the future. Together, students discuss the societal impact and challenges of our digital technologies. Throughout the course, students will learn basic programming skills and concepts that will translate to any programming language and will work individually and collaboratively to create dynamic apps to solve a variety of problems using the JavaScript language.

Learn to Make (.5 Credit): This course is a hands-on introduction to personal fabrication and innovation in the Wang Innovation Center (WIC). The course specifically looks at design thinking, computer-aided design, computer controlled cutting, electronics production, 3D scanning and printing, electronics design, machining, molding and casting, input devices, output devices, composites, mechanical design, invention and intellectual property. Students in this course can explore their own interests to develop creative projects that foster critical thinking, entrepreneurship, communication and collaboration while engaged in active learning with others. Students will demonstrate their competence by completing a series of projects utilizing the full capabilities of the WIC. Open only to freshmen.

Learn to Live Well (.5 Credit): This course introduces students to the dynamic processes of change and growth so that they make informed, healthy decisions about their self-care. Students learn the risks associated with certain behaviors and understand when to seek help for themselves and others. Completion of this course satisfies the State of Ohio health graduation requirement.

Learn to College (.5 Credit): Designed to assist WRA juniors as they embark on the college process, this course seeks to prepare students for all aspects of their journey to higher education. Interpersonal, professional, and academic skills are merged in this course to ready students to be best prepared for college visits, interviews, application completion, and major/program selection.

CL Compass (1.0 Credit): Compass aims to connect students with the world beyond the walls of Western Reserve Academy by cultivating their unique interests and talents and applying them to a “real-world” setting. A second, but not secondary, aim of Compass is to bring coherence to WRA students’ broader academic pursuits. Over the course of the academic year, enrolled students will meet regularly with the compass coordinator and work to develop skills in the areas of project design, collaboration, scheduling and implementation, budgeting, proposal development, making a pitch, leadership and resilience, process reflection, professionalism, marketing, research, interviewing, presentation, et al. At the end of the academic year, students will present their work for assessment before a chosen assembly. In order to be eligible for this program, students must submit an application, which will be evaluated by the various members of the program’s steering committee. Only rising juniors and seniors are eligible to apply.

Automotive Engineering Design (.5 Credit): This course will introduce the fundamental principles that constitute good engineering practices through a series of projects, culminating in the construction of a push powered Go Kart. These engineering best practices include the importance of specifying the objectives of the design, carefully documenting the design process, and continual evaluation and iteratively refining the design through well controlled testing. Although not typically thought of as “creative”, engineering often allows many successful alternative solutions to a single problem, and this will also be an emphasis of the course. Relevant scientific principles (center of mass, forces and moments, rotational inertia) will be introduced as appropriate in a classroom setting. Other days will be spent in the WIC actually building and testing components of design. The course will

culminate in a race day, where students' cars will be evaluated on a number of performance criteria (handling agility, stopping distance, odometer accuracy, drop test).

Engineering and Fabrication (.5 Credit): This course builds upon the principles and applications of engineering and fabrication. It is an immersive hands-on class designed around rapid prototyping and fabrication machinery. The course focuses on, but is not limited to computer aided design, computer controlled cutting, 3D printing, molding and casting, electronics production and design, CNC milling, water jet cutting, robotics, microcontrollers and welding. Each student will complete a series of projects illustrating their competence in each process.

Advanced Engineering and Fabrication (.5 Credit): This course builds upon what students learned in the Digital Engineering and Fabrication course while maintaining an immersive hands-on approach to the exploration of digital fabrication tools and methods. The course focuses on an introduction to CNC milling, CNC lathe, CNC router, CNC plasma cutting, water jet cutting, advanced electronics, robotics, microcontrollers, printed circuit boards, molding, casting and welding. The student should have some familiarity with CAD design.

Mechanical Engineering (.5 Credit): This course introduces students to the design and selection of mechanical components such as shafts, bearings, gears, fasteners, springs, clutches, brakes, chains, joints and motors. Special emphasis is placed on analysis and design of machine elements, material joining, components, and mechanical systems. This course should be taken after Engineering and Fabrication. The course will conclude with students focusing on building a mechanical vehicle incorporating the skills learned during the course.

CL Fab Academy (1.0 Credit): The Fab Academy is a fast paced, hands-on learning experience where students learn rapid prototyping by planning and executing a new project each week, resulting in a personal portfolio of technical accomplishments. It teaches the principles and applications of digital fabrication by proving ability on each project. There are 20 projects the student must complete to earn the Fab Academy diploma from the Fab Foundation. Those areas are project management, computer-aided design, computer-controlled cutting, electronics, CNC, molding and casting, composites, embedded programming, 3D printing and scanning, input devices, application programming, mechanical design, output devices, networking, machine design, invention, intellectual property, and income. The course is a global course where students spend one day each week learning with FabLabs from around the world and the remaining days working on the projects for each week. The course culminates with the student creating a final project. Students who complete the requirements are eligible to earn the Fab Academy diploma and attend the global graduation in early August. Students must take Engineering and Fabrication or Advanced Engineering and Fabrication to enroll in Fab Academy.

Graphic Design and Illustration (.5 Credit): This course focuses on graphic design and designing innovative digital media using Adobe Photoshop, Illustrator and InDesign. Students will engage in a peer based interactive design curriculum that will focus on the skills essential to graphic design. The course will split time working on projects in Photoshop, Illustrator and InDesign and then applying those designs to the machines in the Wang Innovation Center (WIC). Photoshop is the industry leader in digital photo manipulation. Illustrator is the industry leader in vector based graphic illustration. InDesign is desktop publishing software used to create professional posters, brochures, magazines, newspapers and books. Students will be prepared to take the Adobe certification exam at the completion of the course.

3D Printing and Design (.5 Credit): This course introduces students to the principles of designing and printing 3D models using additive manufacturing. The course provides an in-depth understanding of the technical and advanced design principles that make up additive manufacturing while exploring the fundamental materials, technologies and applications of 3D printing and scanning. The course will also spend time learning design principles and considerations for 3D printing. The class will allow students

to print on fused deposition, stereolithography and selective laser sintering printers. They will also assemble their own 3D printer. Students will be prepared to take the industry additive manufacturing certification exam.

E-textiles and Fabrics (.5 Credit): This interdisciplinary course exposes students to the world of fashion through sewing, embroidery, weaving, textiles, wearables and e-textiles. Using the resources in the Wang Innovation Center, students also will explore embedded electronics with textiles and fabrics to create interactive wearables and e-textiles. The course will spend time learning about fashion and fabrication roles. Students will learn the fundamentals of a sewing machine, fabric types, seams, stitches, looms, electronics, microprocessors and programming as they complete projects demonstrating their understanding of each.

Artificial Intelligence and Machine Learning (.5 Credit): This course explores the principles and underpinnings of artificial intelligence and automated manufacturing. The course will introduce students to the basics of artificial intelligence. Students will cover machine learning, neural networks, visual recognition, speech recognition and processing and object manipulation. They will gain exposure to Python programming languages. Students will also learn how to program an industrial robot and its integrated vision. The course will spend considerable time on learning the fundamentals of robotic programming and operations. Students will be prepared to earn their industry recognized robotic operations and programming certifications after the completion of the course.

Idea to Product: How to Start a Business (.5 Credit): This course uses the entrepreneurship process to teach and reinforce a wide range of academic skills. In small groups or solely, students will identify their own innovative product idea and then follow all the steps to product launch using the resources in the Wang Innovation Center (WIC). They will develop the idea, design the product, and finally market it. The class will focus on an introduction to innovation and entrepreneurship, securing intellectual property, patents, product research, collaborative brainstorming, engineering, 3D printing, packaging, graphic design, product modeling, marketing and presentation. A product will be produced by each student. Guest speakers and visits to local businesses will connect the students to other entrepreneurs and innovators in Northeast Ohio.

Digital Video Editing and Effects (.5 Credit): This course introduces the student to the art and craft of through the creation and editing of videos. The course will explore the techniques that are applied in editing programs and allow the student to create their own video projects. The course will be designed to explore how to successfully edit and create video using Adobe Premiere Pro and Adobe After Effects. A special emphasis will be placed on using green screen techniques, chroma keying and After Effects to create Hollywood caliber special effects. Students will be prepared to take the Adobe certification exam at the completion of the course.

Architectural Restoration (.5 Credit): This course, an homage to the classic PBS restoration and renovation series This Old House, will be a project-based learning experience, driven by student leadership and initiative, to oversee and execute the multi-phase restoration of a historic barn on the WRA campus. Students will participate in each step of the process, from developing a budget, to writing grants and designing opportunities for fundraising, to understanding supply chain management and adhering to restoration laws and regulations. Students will also partake in creating blueprints for the redesign; learning techniques of electrical wiring and hanging drywall; and hiring contractors while considering budget and quality assurance. Throughout the process, they will learn to negotiate with one another and businesses through effective conflict-resolution techniques. Ultimately, students will gain firsthand experience in the financing, management, marketing, and operations of a multi-year, multi-step project: restoring This Old Barn.

Digital Fabrication Capstone (.5 Credit): This course is an opportunity to develop an in-depth fabrication project in the Wang Innovation Center. Students will create a project plan, hone project management skills and develop a final project using various skills, technologies and techniques of

fabrication. Students will have the opportunity to present their final project either internally or externally at a Maker Faire. Prerequisite: one course in Technology Arts or Learn to Code/Learn to Make.

Service-Learning Engineering (.5 Credit): Students will participate in an organized service activity that meets identified community or global needs and reflect on the service activity in such a way as to gain further understanding of the root of the issue at hand. After identifying the need, students will use their creativity and apply science concepts relevant to the project in order to design, produce, and deliver real products that will be used by the community being targeted for the project.

Disruptive Ideas (.5 Credit): Sometimes it takes a wild idea, a stubborn mind, and a pinch of genius to change the world. In this course, students will explore transformative ideas in science and the history of humanity. Students will explore the historical and scientific context of several world-changing ideas of the last 6,000 years and ponder what idea might change the world next.

Speech (.5 Credit): Ever needed to demonstrate a specific skill clearly and concisely? Want to persuade a friend to change his or her mind about something? Need to express thoughts without words? Hope to impress classmates and teachers with an excellent presentation? This course is made to improve and mold one's confidence, content, and delivery when speaking in front of others. Public speaking is an elemental skill every student needs in order to function in today's world inside the classroom and beyond. Students concentrate on preparing and delivering a variety of speeches, culminating in a persuasive speech they have written and researched, using the skills of logical thinking, organization, research, and expository writing.

Applied Positive Psychology (.5 Credit): Learn how to hack your brain, re-orient your environment, and build habits to experience what the ancient Greeks refer to as eudaimonia or "the good life". Building on the latest research from Positive Psychology, student will engage in "re-wirements" to increase awareness, empathy, gratitude, compassion, and resilience to learn better and live better. Demonstrations of learning include a reflective journal, applications of concepts to case studies, and a culminating project in which students share and apply these practices beyond the classroom.

Principles of Athletic Training (.5 Credit): Students will get a thorough introduction to the profession of Athletic Training as well as its different areas of study and practice. This course will provide students with a blend of formal classroom lectures (on topics such as anatomy, physiology, medical terminology, etc.) as well as a hands-on lab component to give students real world experience on the concepts that they will be learning (ie. injury evaluation, taping, therapeutic modalities, etc.). Students will be graded on attendance, various homework assignments, quizzes, the ability to properly perform lab competencies, and a final written exam.

Advanced Principles of Athletic Training (.5 Credit): This course builds upon the foundational knowledge that was laid for students in the Principles of Athletic Training class. This course will cover advanced topics such as upper body injury evaluation and rehabilitation, a comprehensive look at concussions and the current state of research on head trauma, take a more in-depth look at medical terminology, cover more unique aspects of sports such as proper protective equipment, as well as the administrative components and considerations of sports medicine (emergency action plans, legal implications, etc). This will be achieved through a combination of classroom lectures as well as hands-on learning in the athletic training room.

Mission in Action (.5 Credit): It's time to 'Think Globally and Act Locally' even beyond 'Excellence, Integrity, and Compassion'! Using the Global Goals established by world leaders in 2015 as a starting point for our study and discovery, students will explore how purposeful individual action can be a catalyst for societal change. This is an academic enterprise as well as a hands-on, down-and-dirty, get-err-done kind of class!

The Evolution and Impact of Advertising (.5 Credit): Advertising has experienced many changes from ancient Egyptian etchings to print ads, to the Golden Age of television, to today's vast universe of user-generated content, social media and influencer campaigns, memes and online selling. Students will study the cultural intersects at each age and stage of advertising and dive deep into the world of branded content, specifically studying branded film. Assignments will require students to consider and capture life at Reserve from new angles (mostly on their phones). This course is an opportunity for students to learn about advertising history and make their own.

MATHEMATICS

Math 11 Algebraic Reasoning(1.0 Credit): This first year algebra course introduces students to linear equations and graphs, exponential expressions and quadratics. Topics include numerical and algebraic operations, solving equations and inequalities, absolute value functions, rational expressions, introductory work with quadratics and various applications.

Math 15 Algebraic Concepts & Applications (1.0 Credit): This course is designed for students who will benefit from greater focus on the fundamentals of algebra needed for more rigorous high school mathematics. Topics include linear equations and graphs, operations with exponents and radicals, linear and quadratic systems, displaying univariate and bivariate data. Students will create a solid foundation and develop effective habits related to the study and application of mathematical concepts. Placement is based on previous coursework, standardized test scores, and/or a WRA placement test. Prerequisite: Math 11 Algebra I.

Math 20 Algebraic Reasoning (1.0 Credit): A continuation and extension of Algebra I, this class provides critical practice and a more in-depth look at algebraic foundations. Focus will be placed on building connections between and among topics, understanding “why” and learning to apply concepts to real world situations. Foundational topics include numerical and linear operations, linear equations and their graphs, basic functions, understanding exponents and radicals and quadratics. Prerequisite: Math 11 Algebra I.

Math 21 Geometric Reasoning (1.0 Credit): This course is designed for students who have successfully completed an algebra course, and demonstrated proficiency on the appropriate placement test. This course combines geometry, statistics, probability and spaced-interval practice of algebra to draw upon the abstract reasoning and spatial visualization skills necessary for future success. Students develop and apply basic theorems and constructions in geometry, discern details and applications of visual displays for quantitative and categorical data in statistics, and apply basic counting methods of probability. Algebra review will be spiraled into daily practice and built upon as a final springboard towards the next year’s course in mathematics. Prerequisite: Math 11 or departmental permission.

Math 22 Honors Geometric Reasoning (1.0 Credit): This course is designed for students who have demonstrated strong reasoning skills and an ability to grasp new concepts quickly. Students have the opportunity to study topics in greater depth, and encounter more challenging problems. The course is designed to develop students’ ability to learn independently, setting the stage for future work at the honors level. Topics include areas of polygons, volumes of solids, triangles, basic trigonometry, circles and other geometric topics, as well as statistics, probability and spaced-interval practice of algebra and its applications. A previous course in geometry is helpful, but not required. Prerequisite: Math 11 or 15 and departmental permission.

Math 31 Algebraic Reasoning II (1.0 Credit): This course allows students to expand their view of algebra while adding depth to connections with geometry, trigonometry, and statistics. Topics include composite and inverse functions, quadratic and radical functions, exponential and logarithmic functions and basic trigonometry. Emphasis will be placed on understanding the behavior and graphs of the functions studied as well as their applications. Extensive use of the graphing calculator is expected. Prerequisite: Math 21 or Departmental permission.

Math 32 Honors Algebraic Reasoning II (1.0 Credit): This course is designed for students who have consistently demonstrated strong reasoning skills, an ability to grasp concepts quickly and a desire to seek deeper understanding of mathematical concepts. Topics include composite and inverse functions, quadratic and radical functions, exponential and logarithmic functions and basic trigonometry.

Emphasis will be placed on applications, extension problems and connections between and among topics. Students will be expected to synthesize understandings independent of teacher instruction, transfer ideas to new contexts, and prepare more rigorously for class meetings. Collaboration and inquiry during class are especially important. Prerequisite: Math 21/22 and departmental permission

Introduction to Data Science (.5 Credit): This course is offered to students seeking an introduction to meaningful data gathering. Students will learn base probability and counting principles before exploring potential sources of bias, and valid methods of gathering representative data. Students will explore and pose questions that data can help answer, develop data gathering tools, and learn how to write summary of data, including meaningful displays. Students will also explore elements of experimental design, again through the lens of acquiring unbiased statistics. Students will ultimately demonstrate their learning by formulating a question of interest and executing a survey or experiment on a scale beyond the classroom.

Discrete Mathematics (.5 Credit): The Discrete Mathematics course will provide the student with a foundation in non-calculus based mathematics focused on finite natured topics such as sets, matrices, optimization and probability. The students will organize and analyze information in order to analytically and critically think about outcomes. A portion of the course will be devoted to preparation for standardized mathematical testing and college preparatory testing, i.e., SAT,ACT. Prerequisite: Completion of a 30's level course.

Financial Mathematics (.5 Credit): The purpose of the course is to prepare students to make sound financial decisions. Students will develop skills and knowledge related to money management; spending and credit; saving and investing; becoming a critical consumer; financial responsibility and decision making; and risk management and insurance. Additionally, students will participate in simulations that replicate real-world budgeting and personal-finance decision making. Designed for upperclassmen. Prerequisites: Completion of a 30's level course.

Computer Programming: Python (.5 Credit): Students will learn to develop algorithmic thinking and write programs that help them problem-solve everyday tasks as well as delve into techniques to create programs that use classical approaches. Students will use Python to create a portfolio of projects demonstrating mastery of computer science topics and techniques. This class will offer students the opportunity to delve deeper into the field of computer science and its applications for Arts, Math, and Science.

Precalculus (1.0 Credit): This course is designed for students who have developed a foundation of the algebra skills taught in Math 31. This course provides an in-depth study of elementary functions, with an emphasis on the mathematics of change, in preparation for calculus. As such, students work in new ways with familiar topics, honing the algebraic skills needed for continued study with our familiar families of functions: polynomial, rational, exponential, logarithmic, and trigonometric. Students will extend their study of statistics and probability as well. Building on those understandings gained in previous courses, students will now analyze the data they know how to depict and collect and they will explore margin of error, sampling, and the normal distribution. Prerequisite: Math 31 and departmental permission.

Honors Precalculus AB (1.0 Credit): This is a rigorous precalculus course designed to prepare students for CL Calculus AB. This course examines polynomial and rational functions and their applications, trigonometric functions, exponential and logarithmic functions, conic sections, polar coordinates and complex numbers, and introductory limit theory. Prerequisite: Math 31/32 and departmental permission.

Accelerated Precalculus BC (1.0 Credit): This course examines the elementary functions in depth, with an emphasis on graphing and modeling applications. Particular attention is paid to the trigonometric functions. In addition, a study of conic sections, sequences and series, polar

coordinates, parametrics, probability and statistics, vectors, matrices, and limits will round out the precalculus syllabus. In the spring, students will begin their study of differential calculus in preparation for Calculus BC the following fall. Accelerated Precalculus is designed for students who have successfully completed Math 32 and have demonstrated the ability to learn independently at an accelerated pace. Prerequisite: Math 32 and departmental permission.

CL Epidemiology (1.0 Credit): In this course students will study how epidemiologists determine the source of disease, how disease is spread, and the effects of mitigation efforts. Statistical topics will include analyzing data distributions to learn more about diseases, study design, using statistical inference to determine risk factors, evaluating the effectiveness of treatments, etc. In order to deepen students' understanding of the subject, students will also learn about the history of epidemiology, pathogens, the human immune system, and ethical and legal considerations as they relate to public health. Prerequisite: Math 41/42/43. Math 42/43 may be taken concurrently.

CL Computer Science (1.0 Credit): This course emphasizes object-oriented programming methodology, with a concentration on problem solving and algorithm development. It also includes the study of data structures, design, standard algorithms, program analysis and abstraction. This course is open to students who have completed a computer science course or who have previous programming experience and receive the permission of the instructor.

Calculus (1.0 Credit): This introductory calculus course provides students with an in-depth treatment of limits, continuity and derivatives, as well as an introduction to integrals. Working with a variety of applications, this course is appropriate for students likely to study business, economics, or social sciences, as well as those preparing to study science or engineering. In both cases, this course is not meant as a substitute for college calculus, but rather to prepare students for more rigorous study of the subject at the university level. Prerequisite: Precalculus.

CL Calculus AB (1.0 Credit): This course is intended for students who have successfully completed an honors precalculus course and have demonstrated proficiency with algebraic manipulations including trigonometry. This course will focus on limits, derivatives and integrals. Topics will include a calculus-based analysis of graphs, computation and applications of the derivative (graphing functions and calculating rates of change), computation and application of the integral (Riemann sums and accumulated change), and differential equations. Prerequisite: Honors Precalculus AB and departmental permission.

CL Calculus BC (1.0 Credit): Primary topics include a calculus-based analysis of graphs, computation and applications of the derivative (graphing functions and calculating rates of change), and computation and applications of the integral (Riemann sums and accumulated change). Other areas of study include slope fields, differential equations, sequences and series, Taylor series, and the analysis and calculus of parametric, polar and vector functions. Prerequisite: Accelerated Precalculus BC and departmental permission.

CL Calculus-based Probability & Statistics (1.0 Credit): Statistics is the art and science of drawing conclusions from data. Probability is the study of chance behavior, while Calculus provides a methodological basis in both disciplines. This course blends probability theory and mathematical statistics with real-world applications. Students will apply the principles of data analysis, probability models, and inference in a variety of settings; use calculus and other mathematical techniques to develop key results; and communicate statistical and probabilistic reasoning both orally and in writing. Prerequisite: CL Calculus AB or BC and departmental permission.

CL Multivariable Calculus (.5 Credit): Multivariable Calculus is a course intended for students who have successfully completed CL Calculus BC. While designed in part to maintain skills developed in CL Calculus BC, CL Multivariable Calculus also extends the calculus to higher dimensions and further explores connections to the sciences, in particular physics. The course deals primarily with the

techniques and applications of multivariable differentiation and integration, differential equations, physics applications and problems in three-space. Prerequisite: CL Calculus BC and departmental permission

CL Linear Algebra (1.0 Credit): Linear algebra is a branch of mathematics that studies vectors. Linear algebra has a concrete representation in analytic geometry and is central to modern mathematics and its applications. It has extensive applications in engineering, computer science, physics, the natural sciences and social science. Topics include systems of linear equations, matrix theory, linear transformations, basis and eigenvectors, and vector spaces. Prerequisite: CL Calculus AB or Honors Precalculus AB and departmental permission.

MODERN & CLASSICAL LANGUAGES

FRENCH

French 1 (1.0 Credit): This is the foundational course in French. It introduces students to grammar essentials and basic vocabulary with conversation, oral composition, reading and some writing. Emphasis is placed upon comprehension, pronunciation and self-expression. It also provides an introduction to Francophone culture.

French 2 (1.0 Credit): This course is the continuation of the foundational course. It introduces students to complex grammatical structures and focuses on strengthening communication skills through written compositions, readings, oral reports and discussions. The cultures of Europe, Africa and the Caribbean will be explored. Prerequisite: WRA French 1/placement test.

French 3 (1.0 Credit): The focus of the third-level course is the development of proficient expression in the language and the review of essential grammar structures. This goal is achieved through the reading of French and Francophone literature and the use of authentic materials from electronic and audio-visual resources. Prerequisite: WRA French 2/placement test.

Honors French 3 (1.0 Credit): This course concentrates on the development of reading, writing, speaking and listening skills. Through class discussion, oral presentations, and written compositions, students will learn how to interpret the materials critically and continue to improve their oral and written expression in French. While fluency is of utmost importance, students are expected to be precise in their use of grammar and vocabulary. The development of vocabulary and grammatical sophistication will also be cornerstones of the course. The class will be taught entirely in French. Prerequisite: WRA French 2 and departmental permission/placement test.

French Language & Culture (1.0 Credit): This course explores how current global challenges, and social, technological and environmental issues are treated and experienced in the French-speaking world. Authentic materials include essays, short stories, novels, radio programs, films, podcasts, newspapers and magazine articles. Students collaborate on research and evaluation of the sources, form and express opinions, discuss these issues with their peers and make presentations to the community. Prerequisite: French 3/placement test.

CL French Language & Culture (1.0 Credit): This course explores how current global challenges, and social, technological, and environmental issues are treated and experienced in the French-speaking world. Authentic materials include essays, short stories, novels, radio programs, films, podcasts, newspapers and magazine articles. Students collaborate on research and evaluation of the sources, form and express opinions, discuss these issues with their peers and make presentations to the community. Prerequisite: WRA Honors French 3/placement test and departmental permission.

LATIN

Latin 1 and Latin 2 are spent in mastering the vocabulary, forms and grammatical structure of Latin, and in reading sentences and extended passages of graded difficulty. Toward the second half of Latin 2, students make the transition from a predominantly grammar-centered class to a predominately reading-centered class, and students of all sections finish their second year in reading genuine Latin authors, usually either Caesar or Vergil. The reading of Latin authors of different genres continues into Latin 3, in which students move beyond simple translation to the understanding and appreciation of the several poems, orations and histories as works of literature set in specific historical contexts. After completing Latin 2, students move on to Latin 3/Honors Latin 3. Students receiving instructor

permission may enroll in CL Latin Literature.

Latin 1 (1.0 Credit): The fundamentals of vocabulary, forms and syntax are stressed to promote accurate reading comprehension and translation.

Latin 2 (1.0 Credit): The course begins with a review of the material covered in Latin 1. The remaining vocabulary, grammar and syntax required to read Latin authors are introduced during the remainder of the first semester. The second semester is spent reading extended passages of Latin. By the end of the year students will begin reading work by a Latin author. Prerequisite: WRA Latin 1/placement test.

Latin 3 (1.0 Credit): Students read a selection of authors from the Late Republic and Early Empire and make the transition from simple translation to the close reading of the texts as works of literature set in specific historical contexts. Prerequisite: WRA Latin 2/placement test.

Honors Latin 3 (1.0 Credit): Students in Honors Latin 3 will spend the first semester reading and analyzing a diverse array of selections from the canon of Latin literature, prose and verse alike. Authors will include Caesar, Cicero, Pliny the Younger, Tacitus, and Apuleius, among the prose authors, and Catullus, Horace, Vergil, Ovid, and Martial, among the poets. The second semester will be devoted to a close and careful study of one author in particular, with the intention of achieving a strong familiarity with the work of that author and its place in the history of Western literature generally. This course is intended for students who hope to move on to CL Latin Literature. Prerequisite: WRA Latin 2 and departmental permission.

Latin Literature (1.0 Credit): This course is designed for those students who wish to pursue the study of Latin beyond a third year, but who are disinclined to commit themselves to the rigors of CL Latin Literature. Students in this course will continue their exploration of Latin texts, with emphasis given to the exploration of the historical and cultural backgrounds to those texts. As they engage with Caesar's commentaries of the Gallic and civil wars, for instance, they will supplement those texts with more contemporary accounts of the fall of the Roman Republic. Prerequisite: Latin 3.

CL Latin Literature (1.0 Credit): This course will focus on a particular genre, e.g., history, philosophy, epic poetry. Representations of that genre will be explored in great depth. Prerequisite: Honors Latin 3 and departmental permission/placement test.

MANDARIN CHINESE

Mandarin Chinese 1 (1.0 Credit): The first year of Chinese study introduces Hanyu Pinyin and basic characters as well as simple grammar structures. It helps learners build solid communicative skills as they discuss a wide variety of topics. Graded activities on essential topics such as greetings, dates and times, family, food and sports are quickly introduced. Students will study Hanyu Pinyin, the internationally recognized system of phonetic spelling for Chinese, above Chinese character texts, as an aid to speaking and pronunciation. Films, songs, Chinese cuisines and culture activities are part of the curriculum to foster the Chinese culture awareness.

Mandarin Chinese 2 (1.0 Credit): This course is a continuation of Mandarin Chinese 1 designed for students who have a command of the material in the first-year textbook Integrated Chinese (Level One). The course introduces 450 more characters and contains topics such as family life, social issues, and aspects of Chinese culture. It expands learners' understanding of Chinese grammar by focusing on important linguistic structures. It introduces the more formal written-style expressions, which are used in news broadcasts and speeches. Films, songs, Chinese cuisines and culture activities are part of the curriculum to foster the Chinese culture awareness. Prerequisite: WRA Mandarin Chinese 1/ placement test.

Mandarin Chinese 3 (1.0 Credit): This course continues the development of the skills and focuses on

reading, writing, speaking and listening, with special emphasis on effective oral communication with native speakers of the language. Video clips, news and authentic materials created for native Chinese speakers will be frequently used in class. Chinese art, history, films, music and culture will also be discussed. Prerequisite: Mandarin Chinese 2/placement test.

Chinese Language & Culture (1.0 Credit): The emphasis of this course is on communicative skills and cultural exposure. Formal expressions and structures will be introduced through class discussions, oral responses, presentations, and email responses as well as short story writing. Topics studied include college life, Chinese holidays, geographic, relationships and performance art. Prerequisite: Mandarin Chinese 3.

CL Mandarin Chinese (1.0 Credit): The emphasis of this course is on communicative skills and cultural exposure. Formal expressions and structures will be introduced through class discussions, oral responses, presentations, and email responses as well as short story writing. Topics studied include college life, Chinese holidays, geographic, relationships and performance art. Prerequisite: Mandarin Chinese 3/placement test and department recommendation.

SPANISH

Spanish 1 (1.0 Credit): This is the foundational course in Spanish. It introduces students to grammar essentials and basic vocabulary with conversation, oral composition, reading and some writing. Emphasis is placed upon comprehension, pronunciation and self-expression.

Spanish 2 (1.0 Credit): This course is the continuation of the foundational course. It introduces students to complex grammatical structures and focuses on strengthening communication skills through writing, readings, and dialogues. Prerequisite: WRA Spanish 1/placement test.

Honors Spanish 2 (1.0 Credit): This course is the continuation of the introductory course, which builds on the grammatical structures and vocabulary previously learned and completes the presentation of all rudimentary elements of the Spanish language. The focus in the course is on strengthening communication skills through writing, readings in literature, and dialogues. The cultures of the Spanish speaking world will also be explored. As an honors course, it is differentiated from the standard course in the pace, breadth and selection of materials used. This course is taught entirely in Spanish. Prerequisite: WRA Spanish 1/placement test and departmental permission.

Spanish 3 (1.0 Credit): This course involves an intensive overview of prior grammar as well as introduction of the remaining tenses and compound structures. The communication skills are further refined through short essays, oral presentations, and readings of well-known Hispanic authors. Prerequisite: WRA Spanish 2/placement test.

Honors Spanish 3 (1.0 Credit): This course concentrates on the development of reading, writing, speaking and listening skills. Students read literature in Spanish. Through class discussion, oral presentations, and written compositions, students will learn how to interpret the materials critically and continue to improve their oral and written expression in Spanish. While fluency is of utmost importance, students are expected to be precise in their use of grammar and vocabulary. The development of vocabulary and grammatical sophistication will also be cornerstones of the course. This course is taught entirely in Spanish. Prerequisite: WRA Honors Spanish 2/placement test and departmental permission.

Spanish Language & Culture (1.0 Credit): This course examines a wide variety of geographic, cultural and historical settings, as well as current topics and important figures in Latin America and Spain. Students will explore the roles of men, women and children in different societies, immigration, human rights and issues of social justice. Students will also learn grammar in context, and complete writing

activities related to their daily lives and the world around them. To meet the course objectives, the class will draw upon Spanish-language movies and videos, short stories, novels and many other sources. Prerequisite: Spanish 3 or Honors Spanish 3.

CL Spanish - Spain/Latin America (1.0 Credit): These courses will focus on culture and civilization. History, politics, literature, art, and social structures will be explored to help understand the contemporary world in Spain/Latin America. Students in these courses will discover treasured works of Spanish prose, poetry and drama. Critical analysis of texts will follow the historical and sociopolitical contexts that formed the backdrop of each author. Students will be required to take turns leading class discussions and conduct research on authors. Students will be required to write regular compositions, give oral presentations and lead class discussion. These courses are taught entirely in Spanish. Prerequisite: Honors Spanish 3 and departmental permission. These courses will alternate with Latin America being taught in odd numbered graduation years (2023, 2025, etc.) and Spain in even numbered graduation years (2022, 2024, etc.)

Ancient Greek (.5 Credit): This course is designed for those Latin students who wish to broaden their Classical horizons by engaging in an intensive study of ancient Greek. Its pace is akin to that of any intermediate Latin course, with the ultimate objective of achieving a comprehensive and thorough understanding of the grammatical rudiments and vocabulary of Ancient Greek. In the final portion of the academic year, students will read short works or selections from Herodotus, Xenophon, Aristophanes, Plato, et al. Prerequisite: departmental approval.

Introduction to German (.5 Credit): This course is designed for students with an interest in learning German. It will introduce students to grammar essentials, conversation practice and oral production, as well as an introduction to writing and reading practice in German. Students have the choice of many topics from culture and civilization.

SCIENCE

Biology (1.0 Credit): This is a life science course designed for underclassmen, the first science course most students will take upon entering Western Reserve Academy. This course introduces students to the study of living things at many different levels of organization. Overriding biological themes include continuity and change over time, the complementary nature of structure and function, and energy relationships. Major topics included are biochemistry, cellular structure and function, metabolism, genetics, evolution and ecology. Additionally, topics are connected to current events throughout the year. Classroom activities combine learning and doing; including laboratory exercises and investigations, data collection and analysis, laboratory report writing, and varied hands-on activities. Upon completion of this course, students should be able to understand and confidently use the vocabulary and methodology of modern life science in their everyday life.

Chemistry (1.0 Credit): The purpose of this course is to provide students a strong scientific experience through the reading, writing, problem solving and practice of chemistry. Students will become more literate in the sciences and extend their understanding of science as an important component of our world. The educational goals of Chemistry include learning the processes of chemistry, chemistry's connections to other disciplines, and how chemistry relates to life. All fundamental chemistry concepts regarding the structure and function of matter and its energy are studied. Laboratory work emphasizes laboratory techniques, concept application, and chemistry problem solving. Open to sophomores, juniors and seniors not intending to pursue extensive mathematics and science studies at the college level. Prerequisite: Biology. Students taking Math 32 or higher should enroll in Honors Chemistry.

Honors Chemistry (1.0 Credit): This course offers a theoretical approach to the structure of matter, the changes it undergoes and the energy involved. The course provides a scientific experience through the reading, writing, and problem solving of chemistry. Laboratory work emphasizes conceptual application and advanced chemistry problem solving. This course is typically taken during the sophomore year. Open to sophomores, juniors, and seniors intending to pursue extensive mathematics and science studies at the college level. Prerequisite: Math 32 or higher (may be taken concurrently) and Biology.

Experimental Physics (1.0 Credit): This course will emphasize doing physics to learn physics rather than using math to learn physics. Early on, the scientific method will be emphasized, as well as the structured and deliberate process required to conduct a well controlled experiment. Once these skills are developed, the fundamental principles of Newtonian Mechanics will be explored - primarily through open ended lab activities. Is that car moving with a constant velocity? How can you tell? What is the evidence? Students will be encouraged to observe carefully and then use their observations to form coherent/consistent explanations to explain the behavior. Best suited for the less mathematically inclined student who is still curious about why the world behaves as it does. Department recommendation required.

Physics (1.0 Credit): This course is an algebra-based introduction to the study of physics that emphasizes conceptual understanding, problem solving skills and laboratory exposure. Students will study topics in mechanics including one and two-dimensional kinematic motion, Newton's Laws, force, work, energy and momentum. Modern physical ideas such as electricity and electronic circuits may be covered during the second semester. Through in-class lectures and discussions, nightly homework sets and frequent laboratory experiments, students will receive a solid introduction to the study of physics.

Honors Physics (1.0 Credit): This is an advanced introductory physics course. Algebra will be used extensively in this course and basic calculus concepts will be introduced and utilized with appropriate topics. Lab work is integrated throughout the curriculum as necessary. Physics topics include: kinematics (1 and 2 dimensions); Newton's Laws; dynamics; work and energy; linear momentum; rotational motion; gravitation; simple harmonic motion and waves; electric charge and fields; electric potential; electric circuits (DC). Mathematics topics include: differential calculus; integral calculus; vectors and vector operations. Honors Physics is recommended for students who have a firm grasp of algebra and an interest in the sciences. The student who plans to take CL Physics should select this course. Prerequisite: Concurrent Honors Precalculus AB.

CL Microbiology (1.0 Credit): Students explore the world of microbes, including the diversity of microbes and the impact of microbes on the world around them within this course. CL Microbiology is a hybrid course; part in-depth exploration of specific topics, part survey, with a significant emphasis on research, projects, presentations, and laboratories. Students develop an appreciation of microbes while revealing the complexities of these supposed simpler life forms and how this information has allowed us to better understand more complex forms of life. Students learn the foundational laboratory skills employed by microbiologists and build a toolbox of laboratory skills throughout the year while also learning how to mine and interpret primary sources of scientific literature. Many concepts familiar to students from biology class are deeply explored on both a molecular and organismal level, focusing on their pertinence to bacteria, viruses, and their hosts. Immunology, antibiotics, antibiotic resistance, biotechnology, and the ethical concerns specific to microbiology are also studied. Students do a substantial amount of independent work within this course and hone their presentation skills throughout the year. Prerequisite: Biology.

CL Pathobiology of Human Disease (1.0 Credit): In this course, students are taught the basic principles of biology through a hands-on experience using human disease as a model. Students are introduced to the organization and structure of the human body, its development, and evolution. Topics include the various body systems, structures, cells, tissues, and the principles of homeostasis. Through the dissection of cats, fetal pigs, mice and various organs, common diseases such as Type 2 Diabetes, cancer and parasitic infections are explored. Prerequisite: Biology and Honors Chemistry with B or above.

CL Chemistry (1.0 Credit): This course builds upon the chemical principles learned from Honors Chemistry. Students will experience a variety of college-level chemistry topics (kinetics, equilibrium, electrochemistry, and introduction to organic chemistry) to apply their knowledge of chemical principles to real-world scenarios. Laboratory work will focus on experimental design, inquiry based learning, and the conceptual application of chemistry. This course is open to juniors or seniors who are intending to pursue mathematics, science, or pre-med in college or beyond. Prerequisite: Honors Precalculus AB (may be taking concurrently) and A in Honors Chemistry.

CL Physics (1.0 Credit): A college level calculus-based course that emphasizes the fundamental laws and basic concepts of physics. The use of calculus will be explored and utilized where appropriate. Labs are integrated throughout the curriculum where and when appropriate to aid understanding of the concepts explored. There will be a strong theoretical component to this course. This course will cover various topics from classical and modern physics. The topics covered include: kinematics in one- and two-dimensions; dynamics; work and energy; impulse and momentum; rotational motion and angular momentum; gravitation; simple harmonic motion; electric forces and fields; electric potential; electric circuits; magnetic forces and fields; electromagnetic induction; special relativity; basic quantum physics and mechanics. Prerequisite: CL Physics is open to juniors and seniors who have received the recommendation of the Science Department, have completed Honors Physics and have completed or concurrently enrolled in CL Calculus BC. Students enrolled in CL Calculus AB may take the course with the instructor's permission. This course will be ideal for students with the appropriate mathematics background who are interested in studying the natural/physical sciences, mathematics or engineering.

CL Quantum Mechanics (.5 Credit): This course is intended as an integrated upper level calculus application and physics course which will introduce students to the ideas and principles of quantum mechanics (QM). The experiments that lead to quantum theory will be addressed so that students have a basic understanding of the principles of QM. Emphasis will be placed on the mathematical machinery to understand this type of mechanics. Here students will need to have knowledge and proficiency with integration. Topics in linear algebra and basic probability will be addressed where appropriate. Progression of topics will include the Wave Function, Time-Independent Schrodinger Equation, Mathematical Formalisms and QM in three dimensions. Famous tests of the theory along with philosophical interpretations will be addressed. Prerequisite: Honors Physics and CL Calculus AB or higher. CL Physics is not necessary to start learning this topic.

Biotechnology (.5 Credit): This course covers basic methods in biotechnology. Emphasis is placed on techniques commonly employed in most research institutions including prokaryotic and eukaryotic cell culture, nucleic acid technologies, and protein purification along with the use and care of common laboratory instruments. Upon completion, students should have an understanding of the theory, practice, and application of these techniques. Students will demonstrate competency in these objectives by performing experiments in the laboratory, by performing well on laboratory practicals, and by participation in class discussions. Prerequisite: Biology.

Cancer Immunology 1 (1.0 Credit): This course covers basic methods in biotechnology during the first semester. Emphasis is placed on techniques commonly employed in most research institutions including prokaryotic and eukaryotic cell culture, nucleic acid technologies, and protein purification along with the use and care of common laboratory instruments. During the second semester, students will apply these skills to a research project involving cancer immunology. Upon completion, students should have an understanding of the theory, practice, and application of these techniques in research. Students will demonstrate competency in these objectives by performing experiments in the laboratory, performing well on laboratory practicals and participation in class discussions. Open to sophomores and juniors.

Cancer Immunology 2 (1.0 Credit): During the second year as investigators, students will continue to work on their research projects and on the further sharpening of the basic laboratory skills learned in Cancer Immunology 1. These include but are not limited to bacterial, cancer, nucleic acid and protein work. These young investigators will also be expected to help teach these skills to first year students. They will develop their scientific communication skills through assigned research articles and an end of the year PowerPoint presentation. Prerequisite: Cancer Immunology 1 and a well-established research project.

Cancer Immunology 3 (1.0 Credit): During the third year as investigators, students will continue to work on their developed projects and on the maintenance of the basic laboratory skills learned in Cancer Immunology 1 and 2. These investigators will also be expected to help teach these skills to other students and assist with the development of their new research projects. They will continue to advance their own scientific communication skills through assigned research articles, PowerPoint and poster presentations. Prerequisite: Cancer Immunology 2 and a second-year research project with propitious data submitted for evaluation.

Cancer Informatics (1.0 Credit): This course deals with the computational methods required to optimize the acquisition and use of information in order to better understand cancer behavior and development. Students are introduced to the basic computing concepts of the UNIX operating system, genome browsing methods, and biological database searching and analysis. It is intended for students with no computer programming background but with a solid knowledge of freshman biology.

Ecological Sustainability (1.0 Credit): This course explores the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. Students will examine and analyze environmental problems both natural and human-made, and evaluate the relative risks associated with these problems. Students in this course are exposed to the social and

environmental implications of consumer and sustainable development behaviors, population patterns and associated geopolitical implications, and the impact these have on climate change. Students will evaluate the relative risks associated with these problems, and examine alternative solutions for resolving and/or preventing them. Additionally, course concepts and skills are applied to campus, regional, national, and international contexts. Prerequisite: Biology and Chemistry.

Astronomy (.5 Credit): Astronomy is designed to develop a basic understanding of the universe from the small to the very large. The main emphasis of this course will be in understanding astronomical processes and the basic science involved in these processes. An emphasis will also be placed on the history of science and how to use scientific evidence to answer questions. Topics covered include the constellations and motion of the sky, the solar system including our planet and the sun, light and telescopes, the lives and deaths of stars, neutron stars, black holes, galaxies and cosmology. Students will have the ability to use the telescope at the school's Frost Observatory during stargazing nights. Prerequisite: Chemistry, Physics (may be taken concurrently), or departmental permission.

Advanced Astronomy (.5 Credit): This course will focus heavily on astronomical observations, data collection and data processing. It will begin with the basic optics, the branch of physics that deals with light and its properties. This course will explore the mathematics and physics of lenses and mirrors, equipment used in optics to focus or gather light. The main goal of this portion of the course will be for students to design and build their own telescopes. The second portion of this course will focus on data analysis using data generated by other observatories around the world and in space. Students will have the opportunity to contribute, through their analysis of the data, to the larger field of astronomy. Other special topics are explored as well. This course will be more mathematical in nature than Astronomy and is intended as a follow up to that course, however students do not need to have completed Astronomy prior to taking this course. Prerequisite: Physics (may be taken concurrently).

Exercise Physiology (.5 Credit): This course is designed to be an introduction to the physiology of exercise. Students will be exposed to the major concepts surrounding the anatomy and composition of the human body, nutrition and the processing of energy by various bodily systems, and the mechanics of the stress of exercise on the body. The concepts of writing exercise prescriptions, evaluating cardiovascular health, and preventing and managing injuries will also be covered. The laboratory experience will be an essential component of this course. Hands-on activities will include techniques on assessing body composition, strength-testing, cardiovascular fitness, and maximal oxygen consumption. All students enrolling in this course will be expected to participate in labs involving exercise testing. Prerequisite: Biology.

CL Synthetic Biology 1 and 2 (1.0 Credit): This full-year course immerses students in the cutting-edge convergence of biology, engineering, and invention known as synthetic biology. Through an iterative process, students research issues, genes, and various organisms to create a novel genetically engineered machine to address a challenge of their choice. While amassing varied laboratory skills, including DNA analysis, cloning, and the manipulation of microbes, students become adept scientific literature researchers and creative problem solvers. As students build their inventions, they learn the complexity of gene regulation and expression - the ins and outs of how DNA is read by organisms to create a product. Two end goals of the course include the submission of their design of a genetically engineered machine for publication in an online journal and the presentation of their work at a spring synthetic biology conference hosted by MIT.

Ocean Topics (1.0 Credit): In this course students will learn about the diverse groups of marine organisms, their ecosystems and habitats, and current events in today's oceans such as overfishing, ocean acidification, climate change, restoration, and marine protected areas. Through discussion, readings, projects, and labs, students will learn about the diversity of ocean environments and how the creatures that live there are adapted to best survive. Students will learn theories pertinent to ecology as a whole, as well as the specifics to the ocean. The course is designed to be taken as a semester elective or a year-long course, with different topics covered each semester. Prerequisite: Biology.

SOCIAL SCIENCE

Exploring Global Foundations (1.0 Credit): This course, required for freshmen, provides students with an introduction to topics relating to the origins and developments of today's global societies while building the essential seminar skills of reading critically, asking insightful questions, presenting and speaking gracefully and writing effectively. The histories of great civilizations will be viewed through various lenses. Our approach will encourage students to understand seminal texts - religious, philosophical, political, and literary - as an expression of universal human aspirations and cultural development. The seminar format will encourage students to find their voices and express their views on the essential questions the course will pursue. Furthermore, they will work collaboratively to discover a better understanding of the foundations of the past that shape our world today as well as the responsibilities of global citizenship.

Building the Modern World (1.0 Credit): This course, required for sophomores, begins its historical focus circa 1750, moves through the 19th and 20th centuries, and finally, ties into current events today. It seeks to develop students' abilities to think and question analytically through the study of the crafting of modernity in religious systems, developing political structures, artistic expressions, and emerging economies, industry and technologies. Students focus on political, economic and social concepts in association with a selective survey of world cultures and also apply a comparative lens. The teaching of skills will include the analysis of both primary and secondary sources, to acquiring geographical knowledge and learning research methodology. Students will conduct a major research project culminating in a research paper, teaching session, and participation in a poster conference featuring their research topics.

United States History and Government (1.0 Credit): This course, required for juniors, employs the inquiry method and a thematic approach to studying the history of the United States. Each semester students will explore a different theme that has influenced the development of our nation's history across time periods. Possible themes include migration, religion, gender/race, personal liberty vs. civic responsibility, and industry. The investigation into each theme will be organized around the asking of a number of central questions that will help guide students through their study. Students will examine essential moments and/or crucial problems within the American experience from colonial times through to the current era. In addition, the U.S. History course will seek to have students better understand the global forces and interactions that have affected our nation's people, influenced its institutions, and shaped its ideals. Emphasis will be placed on gaining a better understanding of the notion of citizenship and the incumbent responsibilities of a citizen within a democratic republic.

CL United States History and Government (1.0 Credit): This course, intended for juniors but open to seniors, requires departmental recommendation. CL US History provides a chronological survey of the history of the United States of America, starting from the colonial period and continuing to present day. This college-level survey introduces students to the major themes, events, and people that comprise the history of the United States of America; however, it also trains students to do the research and inquiry work of historians so as to interpret historical and modern events. As such, CL US History employs a seminar format to allow students the opportunity to find and develop their voices. In addition to gaining a better working knowledge of key historical events, individuals, and movements, emphasis will be placed on analyzing primary source documents and understanding the nature of historical causation. Additionally, a clear emphasis is placed on understanding the essence and evolution of American democracy. Finally, students will pursue a research question of their own choosing and will share their findings in one of three formats--a research paper, documentary film or website. This research component culminates with all students in CL US History participating in the National History Day Contest held in February and their projects serve as their final exam. Prerequisite: A- or higher in BMW and departmental permission.

Introduction to Arabic and Arab Cultures (.5 Credit): Introduction to Arabic and Arab Culture, is an exposure to the Arabic language similar to a first semester university Elementary I course. Using the first text of the popular Al-Kitaab Arabic language program entitled Alif Baa: Introduction to Arabic Letters and Sounds students learn the alphabet, both by writing Arabic script and correct pronunciation. Emphasis is placed on the development of basic listening, speaking, reading, and writing skills. Classroom teaching is accompanied with online drills and exercises in addition to cultural notes. With the introduction of new vocabulary simple conversations and dialogues will be practiced. The second component of the course focuses on the culture of the Middle East through viewing films and popular media, attending a Friday prayer service at a local mosque, tasting the regional cuisine, and listening to popular music artists from Egypt and Lebanon.

Art History: Raphael to Renoir (.5 Credit): This course focuses on the Western Canon established in the early Renaissance and follows the development of various art mediums through the Impressionist Masters. The arrival of the artist as personage/celebrity will be one of the themes as students examine famous “masters” (both male and female) through the lens of how they worked, their styles, and the way in which they lived and crafted their image as professional artists. The course will seek to look at movements and their masters in depth, studying their lives and the evolution of their catalog of works. Students will have the opportunity to read and study artist sketchbooks and manuscripts and to undertake creative projects. Students will watch documentaries detailing the artistic process and artists’ lives, and examine issues such as collection, theft, restoration and art curation. Additionally, guests — such as alumni working in the art world/industry — will be invited to interact with our class in person or digitally.

Art History: Paint, Build, Shoot! (.5 Credit): This course focuses on art, architecture and photography of the 20th century. Beginning with the post-impressionists, students will explore how the art world explodes with new schools of art (futurism, abstract expressionism, minimalism and pop art). Students will also look at innovations in architectural design from Art Deco to Art Nouveau to the groundbreaking work of Frank Lloyd Wright and Frank Gehry. Finally, students will explore photography as art using the lenses of photographers such as Ansel Adams, Annie Leibovitz, Margaret Bourke-White, Dorothea Lange, Robert Mapplethorpe and Sally Mann. Students will delve into the catalogs, the collections and the writings of these photographic pioneers. Documentaries, museum visits and guest speakers, as well as creative projects and presentations, will form part of the experience of “Paint, Build, Shoot!”

CL Art History (1.0 Credit): During the first half of the year, this course focuses on the Western Canon established in the early Renaissance and follows the development of various art mediums through to the Impressionist Masters. The arrival of the artist as personage/celebrity will be one of the themes as students examine famous “masters” (both male and female) through the lens of how they worked, their styles, and the way in which they lived and crafted their image as professional artists. The course will seek to look at movements and their masters in depth, studying their lives and the evolution of their catalog of works. Students will have the opportunity to read and study artist sketchbooks and manuscripts (such as Brunelleschi’s Treatise on Perspective, Vasari’s Lives of Artists, Da Vinci’s diaries, Gauguin’s Paradise Found, and memoirs and letters by artists such as Claude Monet, Berthe Morisot and Emily Carr). Students will watch documentaries detailing the artistic process and artists’ lives, and examine issues such as collection, theft, restoration and art curation. Additionally, guests — such as alumni working in the art world/industry — will be invited to interact with our class in person or digitally. During the second half of the year, the course focuses on art, architecture and photography of the 20th century. Beginning with the post-impressionists, students will explore how the art world explodes with new schools of art (futurism, abstract expressionism, minimalism and pop art). Students will also look at innovations in architectural design from art deco to art nouveau to the groundbreaking work of Frank Lloyd Wright and Frank Gehry. Finally, students will explore photography as art using the lenses of photographers such as Ansel Adams, Annie Leibovitz, Margaret Bourke-White, Dorothea Lange, Robert Mapplethorpe and Sally Mann. Students will delve into the

catalogs, the collections and the writings of these photographic pioneers. Documentaries, museum visits and guest speakers will also form part of the experience of this course. CL students will have higher requirements of content mastery and will undertake a research project.

CL Economics (1.0 Credit): The aim of this course is to provide an advanced introduction to the basic principles of micro and macroeconomics. The course will begin with a general overview of the nature of “economic thinking.” It will then relatively quickly transition into an investigation of the basic microeconomic concepts of demand, supply, market equilibrium, market regulation, market failure, the effects of taxation and subsidies, the four basic product markets, and the operation of resource markets. After this, the remainder of the course will be devoted to gaining understanding of the workings of the macroeconomy: GDP, unemployment, inflation, the banking system, the operations of the Federal Reserve System, fiscal and monetary policy, and international exchanges of currency, capital, and goods. Students will also acquire understanding as to how various schools of economic thought have arisen, and compete with one another over time, to explain the driving forces at work within the macroeconomy, guiding it either to stability or erratic behavior. Much of the course will entail gaining a working knowledge of the basic graphic models used to describe and explain all of the aforementioned concepts.

CL United States Government & Politics (.5 Credit): This course examines various concepts and key institutions in the United States government and political system. Students completing the course will understand and be able to critically analyze such concepts. The following topics are covered in depth: constitutional democracy; republicanism; political beliefs and behaviors; political parties, branches of government; interest groups and mass media; institutions of government; branches of government; bureaucracies; courts; public policy; and civil rights and liberties. Emphasis will be put on exploring the rich diversity of American political life, showing available institutional alternatives, and explaining differences in processes and policy outcomes.

Space Race-Fighting Cold War on New Frontier (.5 Credit): Open to juniors and seniors interested in exploring the American reaction to the Soviet’s launching of Sputnik I in October of 1957 and the historical context of the subsequent establishment of NASA and this agency’s development of the Mercury, Gemini, and Apollo space programs designed ultimately to land men on the moon and bring them safely back to earth. The course will entail a close reading of Tom Wolfe’s epic piece of New Journalism, *The Right Stuff*, as well as a detailed study of a more conventional narrative history of the early American space program. The viewing of documentary films will, likewise, be a principal feature of the course. Students will be asked to take a lead role in planning and conducting some of the group discussions centered on the aforementioned source material. Finally, students will complete an independent research project based on a related topic of their own choosing that will serve as the final “exam” for the course.

Vietnam: Humbling a Superpower (.5 Credit): Open to juniors and seniors, this course seeks to study the causes and consequences of the United States’ post-World War II involvement in the Vietnamese civil war. Through an exploration of various media—a formal historical monograph, films, contemporary music, art, fiction and primary sources—students will come to appreciate better both the international and domestic politics and cultural impacts of this seminal event in modern American history. Students will be asked to take a lead role in planning and conducting some of the group discussions centered on the aforementioned source material. Finally, students will complete an independent research project based on a related topic of their own choosing that will serve as the final “exam” for the course.

American Presidency (.5 Credit): What does it mean to be considered “the leader of the free world,” and what character traits does the holder of said position need to possess? The President of the United States is said to be the “most powerful man” (so far) on Earth. And yet, it is the legislative branch that is created in Article I of the U.S. Constitution; the executive is created in Article II. This course will analyze a number of the most influential presidencies in the history of the office. Emphasis

will be placed on the economic, cultural, and social patterns of the respective eras, in an attempt to understand how the power and influence of the presidency has changed throughout the nation's history. The state of Ohio - home to no fewer than eight of America's presidents - will serve as the backdrop for our studies, and may allow us the opportunity to travel as a class to one of the memorial locations.

History of the United States Civil Rights Movement: Marching Towards Justice (.5 Credit):

Throughout the history of the United States, African Americans and other minoritized groups have been afforded second-class citizenship and limited access to equal protection. Not complacent in their status, these groups and their allies have worked to transform the nation by actively challenging racism and discrimination; expanding the idea and reality of freedom in America. This course will be an intense exploration of the US Civil Rights movement and its characteristics through a close examination of a variety of primary and secondary sources. Students will be introduced to a general overview of the chronology, landmark cases, and themes of the modern African American struggle for civil rights. Additional emphasis will be placed on the voices of those involved in the struggle, ergo documentary films including the Eyes on the Prize series will be utilized to create a more holistic understanding of both the personal and historical significance of this era. By the end of the course, students will be familiar with major leaders, organizations and events of the Civil Rights Movement and be able to think critically about the social ramifications of race and justice in this country. Prerequisite: US History.

CL Philosophy (1.0 Credit): The objective of this course is twofold: first, to gain an initial understanding of the principal contributions to the "great conversation" of philosophy, beginning with the presocratics in the ancient Greek world and continuing to our own era; second, to acquire a strong familiarity with the driving questions of philosophy, such as those concerning ultimate reality, knowledge, freedom, morality, God, the soul, et al. Emphasis will be given to primary sources, but secondary materials will on occasion be consulted as well. Discussion will play a central role in the course, but two substantive papers will also be written, one toward the end of each semester. It is hoped that in addition to achieving the course's twofold objective, students will come away from the experience with the conviction that philosophy is not only a worthwhile endeavor, but an inherently valuable one. Prerequisites: B+ in both US History and Angles in Writing.

Global Health (.5 Credit): This course provides students with various lenses through which to view global health examining historical phenomena like the bubonic plague, the Spanish flu, the invention of vaccinations and antibiotics, and determine how these inform future ways of tackling disease and ensuring public health. Additionally, students will look at post-disaster relief efforts, the creation of sanitation systems, and the building of refugee camps with an emphasis on thoughtful and ethical design. Students should leave this class with the skills to assess crisis situations and to fashion efficient solutions that respect human life, resources and the environment. The course will focus on collaboration and is perfect for those interested in the intersection of history, medicine, science, social justice and public policy.

Global Mental Health - Historical Trauma & Recovery (.5 Credit): This course will look at the impact of historical trauma and efforts, both successful and failed, of restoration and recovery. Students will examine the impact of slavery in North America and proposed reparations programs; the genocide of Native Americans (and attempted amalgamation of remaining tribal members) through Indian boarding schools and the relocation of populations to reservations in the U.S. and Canada; the generational trauma of Cambodian refugees and programs to help with resettlement; survivor guilt and the generational trauma of Holocaust victims; the genocide of Rwanda and truth/reconciliation trials; the impact of apartheid and the work of the truth/reconciliation commission; and proposed similar actions (justice trials) in Armenia and Bosnia and why they've not come to fruition.

Native American Heritage & Culture (.5 Credit): This course examines the variety of indigenous cultures that existed in the Americas prior to European contact and settlement and how those

societies have fared and endured since the arrival of colonists and the creation of new nation-states. Students will focus on regional tribal cultures and their traditions including mythology, relationships to ecosystems, arts and technology, and food and folkways. Students will seek out native voices to understand the conflicts that have occurred with conquest and occupation, and how Native Americans have responded by re-invigorating their heritage and re-establishing their rights. Film, literature, poetry, music and art will be used in addition to historical treatments and primary sources to comprehend the Native American experience.

History of Hudson and WRA (.5 Credit): Anyone who has attended WRA knows that Hudson, Ohio played a role in the historic Underground Railroad; but most can not say much more than that. Beginning with David Hudson's settling in the town that now bears his name, this course will survey the history of the Western Reserve of Connecticut, the town of Hudson, and the school we all call our Second Home, Western Reserve Academy. On-site research will be performed in both the WRA Archives and the Archive Room at the Hudson Library & Historical Society. And, weather permitting, a good portion of the spring semester will be spent out-and-about Hudson, exploring some of its historical sites.

East Asian History (.5 Credit): This survey course will introduce the modern history of East Asia (China, Japan, and Korea). The course will begin in the 17th century with challenges to the dynasties of each country and examines how East Asia emerges through war, commerce, interregional cultural exchange, the impact of the west (imperial expansion and colonialism), revolutionary movements and nationalism. Students will use primary and secondary source material to analyze the major themes of the region's history. Students will also consider several global issues facing the region today.

Music History (.5 Credit): This course is designed to help students understand music by placing it in a historical and cultural context. Guided listening and classroom assignments are augmented with attendance at live musical performances whenever possible--including those by the Cleveland Orchestra. Previous musical experience is not required, but this course is highly recommended for those students intending to pursue further study in music.

Introduction to Geography (.5 Credit): This course is an introduction to how geographers view the world and contribute to our understanding of it. Geography fosters systems thinking and a global perspective. The following three fundamental questions guide our thinking: What do we observe? Why is it there? What is the significance of its occurrence? These questions help to explain the world in its physical appearance (physical geography) and the phenomena of the human experience (human geography) at different scales from the global to the local. The course covers the following topics: landforms, weather and climate, natural resources, population and culture. Maps and mapmaking are introduced.

Introduction to Geographic Information Systems (GIS) (.5 Credit): This course is an introductory course. GIS transforms static maps into dynamic and interactive multimedia and reflects the integration of technological innovation and vast amounts of geographic data. Students learn the use of QGIS to process location-based data and apply spatial thinking. They will learn to integrate spatial concepts, spatial representations, and spatial reasoning to solve a sequence of applied problems across a wide range of topics. Fundamental concepts and methods of GIS such as data structures and operations, geographic frameworks, and principles of cartographic design are addressed.



GRADUATION REQUIREMENTS

WRA graduates must complete a four year program of study. Four year students earn a minimum of 27 credits, while meeting specific departmental requirements, listed below. Transfer students take a full course load earning a minimum of 21 credits and must meet specific departmental requirements.

ENGLISH: (4 credits) Four-year sequence and successful completion of the Junior Writing Exam.

FINE & PERFORMING ARTS: (2 credits) Any Fine & Performing Arts courses.

INTEGRATED STUDIES & DESIGN: (2 credits) Including Learn to Live Well, Learn to Make and Learn to College.

MATHEMATICS: (4 credits) 4 years of mathematics at WRA, with one credit at the 30 level or higher.

MODERN & CLASSICAL LANGUAGES: (2 credits) Two courses at WRA, including level 3.

SCIENCE: (3 credits) Three full credits in science; Biology, Chemistry and Physics required.

SOCIAL SCIENCE: (3 credits) Three full credits in history including US History and Government.

PHYSICAL EDUCATION: Students earn physical education credit by athletic participation or conditioning at WRA for each academic year.