

**WESTERN RESERVE ACADEMY
ACADEMIC COURSE
DESCRIPTIONS
2024-2025 SCHOOL YEAR**



TABLE OF CONTENTS

ALL COURSE LIST.....	Page 3
COLLEGE LEVEL COURSE LIST.....	Page 5
ENGLISH.....	Page 6
FINE & PERFORMING ARTS.....	Page 11
ENGINEERING & APPLIED SCIENCES.....	Page 16
MATHEMATICS.....	Page 20
MODERN & CLASSICAL LANGUAGES.....	Page 23
SCIENCE.....	Page 28
SOCIAL SCIENCE.....	Page 32
GRADUATION REQUIREMENTS.....	Page 37

ALL COURSES 2024-25

ENGLISH

Foundations of Text
Explorations in Analysis
Angles in Writing
Creative Writing: Fiction
Film Studies
Nature Writing & Ethics
Revision & Remix
Speculative Fiction
Storytelling & Sports
Writing for Publication
CL American Literature & the Free Market Economy
CL Divided by Class
CL Power of Language
CL Shakespeare

FINE & PERFORMING ARTS

Art 1
Art 2
Advanced Art
3D Art
Ceramics 1
Ceramics 2
Advanced Ceramics
Environmental Art
Photography 1
Photography 2
Advanced Photography
Studio Art Concentration
Dance 1
Dance 2
Advanced Dance
Choir
String Orchestra
Symphonic Winds
CL Music Theory
Studio Music
Jazz Ensemble
Digital Music Production
Advanced Digital Music Production
Musical Theater Performance
Advanced Musical Theater Performance
Acting 1
Acting 2
Costume Design
Stagecraft 1
Stagecraft 2
Speech

ENGINEERING & APPLIED SCIENCES

Automotive Engineering Design
Agricultural Engineering
Engineering and Fabrication
Advanced Engineering and Fabrication
CL Artificial Intelligence & Machine Learning
CL Robotics & Automation
CL Engineering
Graphic Design and Illustration
3D Printing and Design
E-textiles and Fabrics
Digital Video Editing and Effects
Engineering Capstone
Advanced Technology Practicum
Advanced Technology Teaching Practicum
Idea to Product: How to Start a Business
Principles of Athletic Training
Advanced Principles of Athletic Training
Exercise Physiology
Health Science and Wellness
CL Compass

MATHEMATICS

Math 11 Algebra 1
Math 15 Algebraic Concepts & Applications
Math 21 Geometry
Math 31 Algebra 2
Math 32 Honors Algebra 2
Introduction to Statistics
Discrete Mathematics
Financial Mathematics
Math 41 Precalculus
Math 42 Honors Precalculus
Math 43 Honors Accelerated Precalculus
CL Statistics
Math 51 Calculus
CL Math 52 Calculus AB
CL Math 53 Calculus BC
CL Differential Equations
CL Multivariable Calculus
Introduction to Computer Science
Computer Programming: Python
CL Computer Science
CL Advanced Math Teaching Practicum

MODERN & CLASSICAL LANGUAGES

French 1
French 2
Honors French 2
French 3

ALL COURSES 2024-25

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

CL Economics
CL Philosophy
CL Ethics
CL Frederick Douglass
CL Art History/Art History: Modern
CL African American Studies 1
CL African American Studies 2
International Relations
Mission in Action
Anthropology of Food Systems
Political Science & United States Government
Political Science and Comparative Government
World Religions: East
World Religions: West
History of Hudson and WRA
Introduction to Geography and
Geographic Systems
Psychology
Introduction to Law
Mock Trial
1968 - The Unraveling of America

SCIENCE

Biology
Chemistry
Honors Chemistry
Conceptual Physics
Physics
Honors Physics
CL Microbiology
CL Chemistry
CL Physics
Cancer Immunology 1
Cancer Immunology 2
CL Cancer Immunology
Ecological Sustainability
Astronomy
CL Synthetic Biology 1
CL Synthetic Biology 2
Ocean Topics

SOCIAL SCIENCE

Exploring Global Foundations
Building the Modern World
United States History and Government
CL United States History and Government

COLLEGE LEVEL COURSES 2024-25

ENGLISH

American Literature and the Free
Market Economy
Divided by Class
Power of Language
Shakespeare

Philosophy
Ethics
Frederick Douglass
Art History: Modern
African American Studies 1
African American Studies 2

FINE & PERFORMING ARTS

Music Theory

ENGINEERING & APPLIED SCIENCES

Artificial Intelligence & Machine Learning
Robotics & Automation
Engineering
Compass

MATHEMATICS

Statistics
Calculus AB
Calculus BC
Multivariable Calculus
Differential Equations
Computer Science
Advanced Math Teaching Practicum

MODERN & CLASSICAL LANGUAGES

French Language & Culture 1
French Language and Culture 2
Latin Literature
Mandarin Chinese 1
Mandarin Chinese Language and Culture 2
Spanish - Spain/Latin America

SCIENCE

Microbiology
Chemistry
Physics
Cancer Immunology
Synthetic Biology 1
Synthetic Biology 2

SOCIAL SCIENCE

United States History and Government
Economics

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 addition, this class emphasizes effective annotation, class discussion, textual analysis, and thematic and aesthetic 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 and mid year new upperclassmen students, 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 writings to be assessed 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, voice, 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 the effects 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. Throughout the first semester, students write three to four longer responses — mainly expository in nature — and midway through the year, students participate in the Reserve Writing Exam (RWE), an analytical essay written about a work of prose or poetry. After the RWE, students progress to more independent engagement with the presented texts, culminating in a written project. Students are required to pass the RWE in order to graduate from WRA.

Studies in Literature Electives

Exclusively designed specifically for returning seniors (unless otherwise noted), these courses allow

students to pursue specific interests while satisfying their English requirement for graduation. The goal of the English Department's electives is to provide students with opportunities to engage in material that facilitates, fosters, and expands on their developing relationship with literature and on their abilities to discuss literature on academic and persuasive levels. Offerings vary greatly with regard to style, sequence, and themes; however, all offerings present compelling perspectives on the human experience and on writing in the world. Each of these electives will promote 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. Please note that certain classes and topics may be too mature for younger students.

Creative Writing: Fiction (.5 Credit): Noted American author Jack Kerouac once said, "It ain't whatcha write, it's the way atcha write it." In this course, students will be introduced to the basic elements of short fiction and short plays, 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 and conveying that experience. The emphasis will be on generating raw material specific to short stories and playwriting, getting familiar with some of the essential strategies for reading and discussing the writing of others, and 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 round-table setting, and students 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. *Open to juniors or returning seniors and PGs.*

Film Studies: (.5 Credit): Whether you consider yourself a cinephile or you just like to watch movies, chances are that knowing more about film history and craft would heighten your viewing experience. While this course makes no pretense of providing you with a comprehensive overview of either, it does seek to introduce you to some of the most game-changing movies of all time. Looking at 13 films across the span of over 100 years, you will learn to "read" film as text. To help you understand how, we will learn and discuss introductory concepts in Film Studies, as well as review more advanced scholarship on the material. 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 write about what you learn—whether it be in your dialectic notebook, online discussion boards, on quizzes, or for your final project. Ultimately, you will appreciate why auteurs like Charlie Chaplin, Marlon Brando, and Alfred Hitchcock persist in our cultural capital. Texts may include *The Kid* (Chaplin, 1927); *Dr. Jekyll and Mr. Hyde* (Mamoulian, 1931); *Pinocchio* (Disney, 1940); *Rashomon* (Kurosawa, 1950); *Dial M For Murder* (Hitchcock, 1954); *West Side Story* (Wise and Robbins, 1961); *Harlan County, USA* (Kopple, 1977); *Apocalypse Now* (Francis Ford Coppola, 1979); *Do the Right Thing* (Lee, 1989); *Goodfellas* (Scorsese, 1990); *Lost in Translation* (Sofia Coppola, 2003); *There Will Be Blood* (Anderson, 2007); *Moonlight* (Jenkins, 2016). *Open to returning seniors and PGs.*

Nature Writing & Ethics (.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": 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 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. Please note that, historically, the fall semester of this course

has included a weekend backpacking excursion into the Allegheny National Forest. *Open to returning seniors and PGs.*

Revision & Remix (.5 Credit): During the twenty-first century, a boom of remakes and remixes of literature has occurred. From television and film to comics and board games, societal nostalgia has led to a rise in adaptations (sometimes brilliant, other times a bit cringe-worthy). While the originals are great, these remakes are often unexplored and rich with opportunities for analysis. This course focuses on original works and the remakes that have come after. As a collective, the class will explore various forms of media and the works they are based on. Through both discussion-based learning and individual exploration, students will explore how writers and other artists re-use and remix stories and what these adaptations tell us about self, culture, and this moment in time. *Open to returning seniors and PGs.*

Speculative Fiction (.5 Credit): One appealing feature of science fiction is that it explores that frontier of the unknown: the future. At our best, we imagine an improved tomorrow. But too often the anxieties of modern life produce in us a fear of the worst. In the face of ongoing technological change and imbalances of power, how might our future unfold? What will happen to human society? Will individual agency suffer? The nightmarish—or maybe dreamlike—possibilities are the concern of the seminal works we will examine in this course. Be prepared to think about how the world is now through the lens of how we imagine the world could be. Possible texts include: *The Time Machine* (Wells); *Brave New World* (Huxley); *1984* (Orwell); *The Lathe of Heaven* (Le Guin); *A Clockwork Orange* (Burgess); *The Parable of the Sower* (Butler); *A Children's Bible* (Millet). *Open to returning seniors and PGs.*

Storytelling & Sports (.5 Credit): When it comes to good stories, sports has it all: the glory of winning, the agony of defeat, heroes, underdogs, human characters with their strengths and frailties. The sports' world harbors diverse personalities, features natural narrative frameworks, and intersects with topics from business to education to race. In this class, we will first explore the various ways that stories of sport(s) are told and consumed (i.e. attending a live sporting event, watching a match on "TV," listening to a broadcast on the radio, reading a beat-writer's article, etc.) and then we will expand our scope and lens to consider how sports storytellers move "outside the lines" to discuss specific athletes, illuminate important issues, and present unique tales. Throughout the semester, students will learn to write publishable sports stories while exploring other ways to tell stories that matter to them. If you don't like sports, then this class may not be ideal for you. *Open to returning seniors and PGs.*

Writing for Publication (.5 Credit): This course serves a dual function: it introduces students to the field of journalism, and it provides students with first-hand opportunities to take part in the field. To that end, students will learn many of the how to's of successful and effective journalism: how to recognize stories worth telling; how to gather facts through the practice of skillful interviewing and research; how to identify and draw upon sources; how to craft strong ledes; how to create both news and feature articles in order to inform and engage readership; how to independently practice the art of revision; how to understand the difference between hard and soft news; and how to develop, structure, and achieve strong storytelling. Please note that this course requires that student articles be both for and about the WRA community — each of your pieces will be submitted for publication in our school newspaper, *The Reserve Record*. *Open to freshman, sophomores, juniors and returning seniors.*

College Level Courses

College Level (CL) Studies in English courses are designed to challenge and engage the most proficient and passionate WRA English students at the college level. Exploring literature, composition, and rhetoric on deep and profound levels, CL courses are offered as half-year electives, and seniors must enroll in English both semesters in order to graduate. 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 these courses. 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 of the department. Students who are not initially recommended may petition, and their application will be reviewed by our internal College Level Committee.

CL American Literature and the Free Market Economy (.5 Credit): What is the true worth of the dollar? What is the cost of that worth? In recent decades, the human cost of the free market has been often in the news, from international currency wars that have put the market on high alert to how inflation affects people’s day-to-day lives. In this course, we will first work to understand what money means to human experience, and then we will take a look at the way literature offers a lens to focus on our relationship with money—first from the American perspective, and then from a more global one. From Saul Bellow’s tale of a day-in-the-life of a man who loses everything in the commodities market to Jewell Parker Rhodes’s novel depicting the Tulsa massacre that destroyed generations of Black wealth, we will explore how capitalism has shaped American culture and how the global economy continues to reshape it. Possible Texts: *Seize the Day*, Saul Bellow; *Magic City*, Jewell Parker Rhodes; “Bartleby the Scrivener,” Herman Melville; the documentary series *This Giant Beast That Is the Global Economy*, Orson Welles’ *Citizen Kane* and other essays.

CL Divided by Class (.5 Credit): America—the land of opportunity. If you can dream big and work hard, it’ll all be there for the taking. Really? This class examines the “pull yourself up by the bootstraps” narrative to consider to what extent America really is the land of opportunity. We will look at narratives of the filthy rich and the dirt poor, and we will think about the middle classes in between. How fixed are these divisions of social class? Is there any chance of upward mobility? Or are the haves and have-nots socially determined? And what about outside of our borders? Does the world at large operate on a meritocracy? Alongside these questions, we will think about high- and low-brow culture. Is the Metropolitan Opera more tasteful than the rap stylings of Megan Thee Stallion? You decide. Texts include: “The Work of Art in the Age of Mechanical Reproduction” (Benjamin); *Bastard out of Carolina* (Allison); *Educated* (Westover); *The White Tiger* (Adiga).

CL 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, and 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 to 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 of these topics.

CL Shakespeare (.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’ve 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’ve got him? We will attempt to understand Shakespeare in his time and place, historicizing him and his works theatrically, culturally, and politically. We 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*.

FINE & PERFORMING ARTS

VISUAL ARTS

Art 1 (.5 Credit): In this introductory course, students will practice and develop drawing skills, and experiment with a range of both wet and dry media. Students will participate in critique, build a portfolio, complete practice exercises, and exhibit work in the Moos Gallery at the end of the semester. Focus is on idea development, skill building, and learning good studio habits in order to improve one's abilities, no matter a student's level of experience. This course is required for all other 2-D art classes.

Art 2 (.5 Credit): Students will build upon the foundation they have gained in Art I or 3D Art, and utilize this knowledge base to further develop their skills. This class will emphasize the importance of the implementation of the art proposal. Students will embark on a personalized journey focusing on areas in which they are most passionate. Sketchbook required. *Prerequisite: Art I or 3D Art and departmental permission.*

Advanced Art (.5 Credit): Students in Advanced Art will continue to build their art portfolio based upon personal interests, and guided by sustained investigation. Students may investigate in either 3-Dimensional or 2-Dimensional work. *Prerequisite: Art 2 and departmental permission.* This class may be repeated for credit.

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), 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 1 (.5 Credit): Students in Ceramics 1 will learn the fundamentals of clay as well as how to ideate, create, finish, and reflect on their process. Techniques will include hand-building, carving, using additive and subtractive processes, as well as exploring texture, shape, and form. Students will learn building, glazing, and finishing techniques, and throwing on the wheel will be introduced. Design sheets will be used to plan, document, and reflect on their projects, and peer and self-evaluations will allow students to improve their craft. *Prerequisite: Art I or 3D Art or departmental permission.*

Ceramics 2 (.5 credit): Ceramics 2 continues the exploration of expression using clay. Students will hone their craft and learn new techniques including wheel-work and using molds to create their pieces. The course will continue to help students advance their comfort using clay, and will encourage more exploration into experimentation with shape, form, and finish. Students are expected to document their process, use test tiles to determine glaze processes, and research different artists in order to perfect a chosen technique for their final project(s). Students must have taken Ceramics 1 as a prerequisite.

Advanced Ceramics (.5 Credit): Advanced Ceramics is for students who have completed both Ceramics 1, Ceramics 2, and have been approved by the instructor to continue on in Ceramics for a more independent exploration of the medium. Projects include explorations of new techniques and processes, research and deep-dives into artists' works for inspiration and understanding, mixed media using clay as the base, then adding additional materials and processes to create unique and thoughtful works. This class is very self-driven, with the majority of projects/units devised by the students themselves, with support and guidance provided by the instructor. Students will be encouraged to enter their work into relevant competitions and scholarship consideration. This class may be repeated

for credit.

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 will change and affect these art forms. Students must be prepared to work outside in the elements. Rain boots, rain/warm coats, and gloves are all required. Sketchbook required. Junior or senior status, and/or approval of instructor.

Photography 1 (.5 Credit): Students will learn the basics of capturing images using DSLR cameras to control focus, shutter speed, and composition. Post-processing, and photo manipulation will take place in Adobe Lightroom Classic and Photoshop to create both realistic and artistic effects. Students will delve into idea development, design implementation, technical skills, creative risk-taking, and personal expression. Students will also participate in hanging photographs in the hallways, and in the Moos Gallery. *Prerequisite Art I, or junior, senior, PG status and/or approval of instructor.*

Photography 2 (.5 Credit): Photo 2 is for a student who wants to strengthen basic skills learned in Photography, and explore more in-depth shooting, editing, idea development, and the history of photography. Students will investigate subjects, styles, themes and concepts based on both personal interest and contemporary photography practices, as well as continue to hone both the technical and artistic aspects of making images. *Prerequisite: Photography 1 and/or permission of instructor.*

Advanced Photography (.5) Students will continue to build upon their photography skills based upon individual interests, guided by sustained investigation. The culmination of the course will result in a personal exhibition, presentation, or installation of personal work. Students will also assist with helping other students, complete studio tasks, and gain other practical skills in running the Digital Media Lab. *Prerequisite: Photography 2 and permission of instructor; May be repeated for credit.*

Studio Art Concentration (.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 may be seeking opportunities to further their art education at the collegiate level, or are approved by instructors as having shown considerable growth, drive, and commitment in any visual studio pursuit. *Prerequisite: Successful completion of Advanced Art, Ceramics or Photography and permission of instructor.*

DANCE

Dance 1 (1.0 Credit): This course is intended for students who have no previous dance experience. This is a full year course. Dance is a performance art that incorporates mind and body. It takes discipline, dedication, and hard work. The 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. 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. This is a two-semester year long course.

Dance 2 (1.0 Credit): This intermediate level course continues the study and work covered in Dance 1. This course is intended for students who have reasonable dance experience at WRA or from an outside source. Students will be moved into this level after a completed year in Dance 1 or earlier if recommended by the dance teachers. This is a full year course. Dance is a performance art that incorporates mind and body. It takes discipline, dedication, and hard work. The 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. While studying technique, the learning, understanding and practice of dance vocabulary is stressed. Over the course of the year, students will study other areas of educational dance such as kinesiology, history, composition, and how to analyze/ critique. Students are required to participate in two performances,

which are at the end of the first and second semesters. This is a two-semester year long course.
Prerequisite: Dance 1 or departmental permission.

Advanced Dance (1.0 Credit): Students must audition prior to enrolling in this course or be recommended by the dance teachers. This is a full year course. Advanced Dance is appropriate for students with proficient dance experience within the techniques offered through our program. Dance is a performing art that incorporates both mind and body. It takes discipline, dedication, and hard work. The 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. Over the course of the year, students will study other areas of educational dance such as kinesiology, history, composition, and how to analyze/critique. Students are required to participate in two performances, which are at the end of the first and second semesters. Students enrolled in Advanced Dance may also perform at events outside of WRA and have opportunities to work with guest teachers and choreographers throughout the year.

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 (.5 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. The course can be taken as a semester elective or a year-long course.

String Orchestra (.5 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. The course can be taken as a semester elective or a year-long course.

Symphonic Winds (.5 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 working in jazz, film, and contemporary music. WRA has a small selection of instruments for students to borrow who may not have their own. While most students have prior experience, students who are new to their instrument are welcome and encouraged to join. The course can be taken as a semester elective or a year-long course.

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. This is a two semester year long course.

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 (.5 Credit): This course is offered to students who want to develop and grow in their performance and understanding of jazz. Instrumentation is open to any and all interested. Band members will learn advanced scales, sight-reading and elements of jazz theory. Band Members will perform varying styles underneath the umbrella of Jazz Literature, which can include swing, bebop, big band, blues, funk, pop, rock, gospel, fusion and multi-ethnic repertoire. This is a performance-based ensemble where concerts take place both on campus and off campus. The course can be taken as a semester elective or a year-long course.

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 Dua Lipa to Avicii. Topics covered will include stereo processing, analog 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.

Advanced Digital Music Production (.5 Credit): This course builds upon the foundations learned in Digital Music Production. Advanced mixing techniques are explored along with the techniques needed in creating commercial media music. Students will create music for advertisements, film trailers, and their own EP Album. A wider range of music analysis will be examined along with creating special audio effects within Logic Pro X. *Prerequisite: Digital Music Production.*

Musical Theater Performance (.5 Credit): In this semester-long course, students will study the history of Musical Theater, will experience live theater and/or video performances of important pieces, and will study some of theater's superstars. The real purpose of this workshop, however, is actual performance informed by contextual study! Singers, actors, and dancers will prepare solos and/or ensemble pieces for performance and critique. The workshop will culminate in a showcase open to the public.

Advanced Musical Theater Performance (.5 Credit): Advanced Musical Theater Performance is designed to provide an opportunity for serious Musical Theater practitioners to deepen their experience. In addition to revisiting all of the genres performed in the Performance class (with different repertoire), students taking MT Intensive will be expected to participate at an advanced level by creating their own Showcase. They will also be expected to participate in masterclasses with guest artists, prepare mock auditions, and develop a portfolio. *Prerequisite: Musical Theater Performance.*

THEATER

Acting 1 (.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.

Acting 2 (.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 will 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). This course may be repeated for credit.*

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.

Costume Design (.5 Credit): Students will learn the elements of costuming including organization, design, and construction, and participate in a living Costume Shop. Focus is on preparing or making garments and accessories for theatrical productions on campus. Focus is on sewing, where students will learn how to cut and alter a pattern, operate a sewing machine, and adjust existing garments. Students will also assist in costume maintenance and care. More advanced students may be involved in designing costumes or working backstage. This course may be repeated for credit.

Stagecraft 1 (.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 theater and dance, and then experience these distinctions first hand as they help prepare for events in the Knight Fine Arts Center.

Stagecraft 2 (.5 Credit): This course offers a fully hands-on production practicum experience for students interested in the theater arts. Building on techniques and skills explored in Stagecraft I, students will learn and apply advanced scenic construction and painting techniques as they engage in the process of preparing the winter and spring theater productions. Additionally, students will explore lighting and sound production for both theater and dance, culminating in a final lighting design project, which will be included in the spring dance performance. *Prerequisite: Stagecraft 1.*

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.

ENGINEERING & APPLIED SCIENCES

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. Required for freshmen.

Health Science & Wellness (.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. Required for Sophomores and new students without a health/CPR credit.

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, and presentation. 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 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). Open to juniors, seniors and PGs.

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.

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. Students 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.

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. Each student will produce a product. Guest speakers and visits to local businesses will connect the students to other entrepreneurs and innovators in Northeast Ohio. Open to sophomores, juniors, seniors and PGs.

Digital Video Editing and Effects (.5 Credit): This course introduces the student to the art and craft of digital media production 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.

Engineering 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 Engineering & Fabrication or Coding.*

Advanced Technology Practicum (.5 Credit): A student may apply to work as a member of the Technology team. The students will learn and refine skills around hardware and software troubleshooting, installation, and repairs while gaining valuable employment skills. Interested students will email Matt Gerber who will invite promising candidates to interview with the Technology team.

Advanced Technology Teaching Practicum (.5 Credit): A student may apply to be a student teacher for the Learn to Make class. Students will be paired with a mentor teacher to observe and develop rapport with the class, learn teaching techniques, and then plan and teach lessons towards the end

of the semester. Interested students will email Matt Gerber who will invite potential candidates to interview with the Technology team.

CL Robotics & Automation (.5 Credit): This course introduces students to the field of robotics. Students will build and program various robots including autonomous, arm, delta, and SCARA style robots. Emphasis will be given to automation and how robotic automation is transforming industry with visits to several companies who have implemented robotic automation. Students will learn to program industrial FANUC robots and have the opportunity to take industry certification exams in robotic safety and tool handling. Open to sophomores juniors, seniors and PGs.

CL AI and Machine Learning - CL Robotics & Automation (.5 Credit): Explore the frontiers of technological innovation with our AI and Machine Learning course. This class offers a deep dive into the dynamic world of artificial intelligence and machine learning. Uncover the core principles behind AI algorithms, delve into the intricacies of neural networks, and discover the real-world applications reshaping industries. Through hands-on projects, students will gain practical experience in deploying machine learning techniques, from data preprocessing to model evaluation. Ethical considerations are woven into the fabric of the course, fostering discussions on fairness, transparency, and responsible AI development. By the end, students will emerge equipped with the knowledge and skills to navigate the exciting landscape of AI and Machine Learning, making informed contributions to the technological advancements of tomorrow. Open to juniors, seniors and PGs.

Agricultural Engineering - Fall (.5 Credit): Embark on a journey at the intersection of technology and agriculture with our Agricultural Engineering course. This course is tailored for individuals passionate about revolutionizing the way we cultivate and harvest. Students will delve into the principles of engineering applied to agricultural systems, learning to design and optimize growing systems, food preservation, and precision farming technologies. Through a blend of theoretical concepts and hands-on projects, participants will gain practical skills in addressing challenges faced by the agricultural industry. Topics include soil and water management, farm automation, aquaponics, hydroponics, urban agriculture, apiculture, sustainable practices, and the integration of cutting-edge technologies. By the course's conclusion, students will be equipped to contribute to the sustainable and efficient future of agriculture, bridging the gap between innovation and the cultivation of our global food supply. Open to sophomores juniors, seniors and PGs.

CL Engineering - Spring (.5 Credit): Elevate your engineering prowess to new heights in our College Level Engineering course. Geared towards aspiring engineers and makers, this class offers a hands-on journey through the process of turning ideas into tangible reality. Participants will delve into the fundamentals of engineering design, honing their skills in CAD (Computer-Aided Design) software to conceptualize and model projects. The course places a strong emphasis on fabrication techniques, allowing students to bring their designs to life through welding, machining, and 3D printing. With a focus on problem-solving and innovation, students will tackle real-world challenges, applying principles of materials science and manufacturing. By the course's end, participants will not only have a solid grasp of engineering and fabrication but will have also created a portfolio of projects showcasing their ability to transform concepts into meticulously crafted solutions. Prerequisite: Students need to have taken Engineering and Fabrication and Advanced Engineering and Fabrication. Open to sophomores juniors, seniors and PGs.

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 (i.e. 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. Open to sophomores juniors, seniors and PGs.

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. *Prerequisite: Principles of Athletic Training.*

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. This is a single semester course. *Prerequisite: Biology and Chemistry.*

MATHEMATICS

Math 11 Algebra I (1.0 Credit): This first-year algebra course builds upon foundational algebra skills through the study of linear, absolute value, and quadratic functions. Emphasis is placed on fluently manipulating equations, recognizing and using patterns in mathematics, and using math to make meaning through real-world applications.

Math 15 Algebraic Concepts & Applications (1.0 Credit): This course is designed to strengthen fundamental algebra skills required for the study of more rigorous high school mathematics. A foundation of core skills and mathematical manipulations will be stressed with sufficient time given to practice these skills and build effective habits related to the study and application of mathematical concepts. Emphasis will be placed on interpreting mathematical data, making connections between and among topics, and using this conceptual understanding to determine the operations needed to solve problems presented. *Prerequisite: Algebra I*

Math 21 Geometry (1.0 Credit): This course combines geometry and interleaved practice of algebra to draw upon the abstract reasoning and spatial-visualization skills necessary for future mathematical study. Students will discover geometric theorems and explore constructions to develop an in-depth understanding of geometric concepts while increasing algebraic proficiency. *Prerequisite: Algebra I or departmental permission.*

Math 31 Algebra II (1.0 Credit): This course allows students to expand their view of algebra. Topics include composite and inverse functions, quadratic and radical functions, exponential and logarithmic functions, and rational functions. 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 incorporated. *Prerequisites: Algebra I and Geometry or Departmental permission.*

Math 32 Honors Algebra 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, rational functions, and basic trigonometry. Emphasis will be placed on applications, extension problems, and connections between and among topics. Collaboration and inquiry during class are especially important. *Prerequisites: Algebra I and Geometry and departmental permission.*

Introduction to Statistics (0.5 Credit): This course is offered to students seeking an introduction to meaningful data gathering. Students will learn to acquire, describe, and interpret data through surveys and experiments with the intention of acquiring unbiased statistics. Students will learn probability and counting principles with the culmination of skills being demonstrated in a final application project. *Prerequisite: Algebra II.*

Discrete Mathematics (0.5 Credit): The Discrete Mathematics course will provide a foundation in non-calculus-based mathematics focused on finite-natured topics such as sets, matrices, optimization and probability. Applied topics will include voting theory, fair division, apportionment, and cryptography. Students will organize and analyze information in order to analytically and critically think about outcomes. *Prerequisite: Algebra II.*

Financial Mathematics (0.5/1.0 Credit): This course is designed to engage students with real-world financial applications while maintaining mathematical rigor. 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. The course is designed for upperclassmen and can be taken as a semester elective or a year-long course, with different topics covered each semester. Prerequisite: Algebra II.

Math 41 Precalculus (1.0 Credit): This course provides an in-depth study of elementary functions with an emphasis on the mathematics of change. Familiar topics will be investigated in new ways, honing the algebraic skills needed for the continued study and application of familiar families of functions including polynomial, rational, exponential, logarithmic, and trigonometric. *Prerequisite: Algebra II and departmental permission or Honors Algebra II.*

Math 42 Honors Precalculus (1.0 Credit): This is a rigorous precalculus course designed to prepare students for CL Calculus AB. Thorough study and investigation of the six elementary functions as well as conic sections, polar coordinates and complex numbers and their applications will be included. *Prerequisite: Algebra II or Honors Algebra II and departmental permission.*

Math 43 Honors Accelerated Precalculus (1.0 Credit): This course examines the six 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, parametric equations, vectors, matrices, the trigonometric form of a complex number, and limits will round out the precalculus syllabus. An introduction to differential calculus will complete this course which is designed to prepare students for Math 53: CL Accelerated Calculus. *Prerequisite: Honors Algebra II and departmental permission.*

CL Statistics (1.0 Credit): This course is comparable to an introductory college statistics course. Topics covered include data exploration, sampling and experimentation, probability and simulation, and statistical inference. Technology will be incorporated for simulation and calculation. *Prerequisite: Precalculus. Honors Precalculus or Honors Accelerated Precalculus may be taken concurrently.*

Math 51 Calculus (1.0 Credit): This introductory calculus course provides students with an in-depth treatment of limits, continuity, derivatives, and an introduction to integrals. A variety of applications related to business, economics, social science, and engineering are incorporated. This course is designed to prepare students for more rigorous study of calculus at the university level. *Prerequisite: Precalculus.*

Math 52 CL Calculus AB (1.0 Credit): CL Calculus AB is intended for students who have successfully completed Honors Precalculus and have demonstrated proficiency with graphing and 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 and departmental permission.*

Math 53 CL Calculus BC (1.0 Credit): This course provides a thorough study of differential and integral calculus, with an emphasis on theory and applications. 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: Honors Accelerated Precalculus and departmental permission.*

CL Differential Equations (1.0 Credit): This course explores the applications of Differential Equations and focuses on the use of mathematics to model real-world scenarios as well as elementary methods for solving relevant equations. Topics include the solution of first, second, and higher order differential equations, systems of differential equations, and Laplace transform methods. Technology will be incorporated for numerical solutions and qualitative analysis. This course includes project work appropriate for variable levels of calculus backgrounds. *Prerequisite: Math 52*

CL Multivariable Calculus (1.0 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 Advanced Math Teaching Practicum (1.0 Credit): This capstone course is designed to provide an introduction to all aspects of mathematics instruction. Students will prepare class lessons and direct classroom instruction; create and grade assignments and assessments; provide extra help outside of class and facilitate conversations with students regarding their progress and areas of growth. The course allows the student to develop a unique teaching style with the support of a master teacher. Formal written evaluations will be provided. The course will culminate with the student teaching an entire week of the course. *Prerequisite: One course beyond CL Calculus BC and departmental invitation.*

Introduction To Computer Science (0.5 Credit): This one semester course introduces students to foundational concepts of computer science such as hardware and software, operating systems, network architecture, data types, variables, control flow, repetition, functions, and basic data structures. Students will use Scratch, JavaScript, and Python to explore these concepts to solve problems relevant to the community. One module of the course will include working with Raspberry Pi to learn how to create a Human Computer Interface with a program.

Computer Programming: Python (0.5 Credit): Students will 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. *Prerequisite: Introduction to Computer Science or Geometry or Departmental Permission*

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

MODERN & CLASSICAL LANGUAGES

The modern language program at WRA aims to develop fluency in our students in the most effective way. To that end, classes are taught in immersion and value is placed on communication across all four skill areas. Students listen and speak every day in every class. Reading and writing in the target language are key elements of all of our language courses. Students learn through practice and are taught to take ownership of their learning and to understand the meaning they convey through language. Using an intensive structure driven curriculum, students learn grammar and vocabulary and use it to communicate with one another from the start. Learning a language is a cumulative process. In order to build and consolidate language skills, students study and practice language every day in the first semester of level 1. Students who demonstrate a facility for language are recommended to study on the honors track, which sustains the same level of intensity. On the other hand, students who need more practice to develop fluency are placed at the standard level of study.

FRENCH

French 1 (1.0 Credit): This is the foundational course in French. It introduces students to grammar essentials and basic vocabulary with conversation, composition, reading and 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. In addition to grammar the students will read a novel. The cultures of the Francophone world will be explored. This course is taught in French. *Prerequisite: WRA French 1/placement test.*

Honors French 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 French language. The focus in the course is on strengthening communication skills through writing, readings in literature, and dialogues. The cultures of the Francophone world will be extensively 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 French. Students in Honors French 2 typically continue into Honors French 3 before enrolling in the CL French Language & Culture course. *Prerequisite: WRA French 1/placement test and departmental permission.*

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 is 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 (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.*

CL French Language and Culture 2 (1.0 Credit): This course will focus on the culture and civilization of the Francophone world. History, politics, literature, art, and social structures will be explored to help understand the contemporary French speaking world. Students in this course will discover treasured works of French 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. This course is taught entirely in French. *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 predominantly 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.*

Honors Latin 2 (1.0 Credit): Students in Honors Latin 2 will build on their knowledge of Latin vocabulary, grammar, and syntax and will review the material covered in Latin 1 while reading selections from Julius Caesar in the first semester. By the end of the year, students will be prepared to read unadapted Latin prose and verse from a variety of authors and time periods. As an honors course, it is differentiated from the standard course in the pace, breadth and sophistication of materials. Students in Honors Latin 2 typically continue into Honors Latin 3 before enrolling in the CL Latin Literature course.

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 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 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, geography, relationships, and performance art. *Prerequisite: Mandarin Chinese 3/placement test.*

CL Mandarin Chinese Language and Culture 1 (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, geography, relationships and performance art. *Prerequisite: Mandarin Chinese 3/placement test and department recommendation.*

CL Mandarin Chinese Language and Culture 2 (1.0 Credit): This course will focus on Chinese culture, current events on campus and in the world, and discuss students' study at WRA as well as their academic plans in college. Students will create a list of topics to discuss at the beginning of each semester. BBC Chinese and other online resources are supplementary materials. Every two weeks, students will be required to compose an essay of a chosen topic and make a 3-4 minutes long video regarding the topic. The videos will be posted on the closed Facebook group specifically for WRA students in Chinese programs or be shared on students' YouTube channel. Students will present two of the videos in CL Chinese class and lead the discussions. This course is taught in Mandarin Chinese.

SPANISH

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

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 written compositions, readings, oral reports, and discussions. In addition to grammar the students will read two longer texts. This course is taught entirely in Spanish. *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 in reading, writing, listening and speaking. In addition to grammar, students will read a novel in Spanish. As an honors course, it is differentiated from the standard course in the pace, breadth and sophistication of materials. 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. In addition to shorter readings, students will read a novel in Spanish. Additionally the course explores different cultural traditions through music, articles, and videos. This course is taught entirely in Spanish. *Prerequisite: WRA Spanish 2/placement test.*

Honors Spanish 3 (1.0 Credit): This course uses literature and film to give advanced students the opportunity to strengthen their ability to write analytically and creatively in Spanish. The course also strongly emphasizes speaking and reading in Spanish. Works from various literary genres and selected Spanish-language films are among the materials on which class discussion and writing assignments are centered. To deploy this content, we use digital technology that supports the acquisition of advanced vocabulary, the development of reading comprehension and writing. A grammar review, focused mainly on typical areas of difficulty, may also be included. 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, and current events through news media. 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. 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.)*

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. This course is one semester.

SCIENCE

Biology (1.0 Credit): This life science course is designed as the first science course most students will take upon entering Western Reserve Academy. Biology 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, cell reproduction, genetics, and evolution. 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. This is a two semester year-long course.

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 this course 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, this course is for those not intending to pursue extensive mathematics and science studies at the college level. This is a two semester year-long course. *Prerequisite: Biology.*

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. This is a two-semester year long course. *Prerequisite: At least an A- in Biology or departmental approval and concurrent Math 32.*

Conceptual Physics (1.0 Credit): This introductory physics 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 and consistent explanations to explain the behavior. This physics course is best suited for the less mathematically inclined student who is still curious about why the world behaves as it does. This is a two-semester year long course. Department recommendation required.

Physics (1.0 Credit): This introductory physics 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, universal circular motion, work, energy, and momentum. Through in-class lectures and discussions, nightly homework sets and frequent laboratory experiments, students will receive a solid introduction to the study of physics. This is a two-semester year long course.

Honors Physics (1.0 Credit): This is an honors introductory physics course. Algebra will be used extensively 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. Mathematics topics include: differential calculus; vectors and vector operations. Honors Physics is recommended for students who have a firm grasp of algebra and an interest in the sciences. This is a two-semester year long course. The student who plans to take CL Physics should select this course. *Prerequisite: At least an A- in Honors Chemistry or departmental approval and concurrent Math 42.*

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 understand more complex forms of life better. 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 substantial independent work within this course and hone their presentation skills throughout the year. This is a two-semester year-long course, or the first semester may be taken as a 0.5 credit single-semester course. *Prerequisite: An A in Biology or departmental approval.*

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. This is a two-semester year long course. *Prerequisite: Math 42 concurrent and at least an A- in Honors Chemistry or departmental approval.*

CL Physics (1.0 Credit): This is a college level calculus-based course that emphasizes the fundamental laws and basic concepts of physics. Labs are integrated throughout the curriculum when appropriate to aid understanding of the concepts explored. 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. This course is ideal for students who are interested in pursuing more advanced studies in the natural/physical sciences, mathematics, or engineering, and aligns with the AP Physics C curriculum. This is a two-semester year long course. *Prerequisite: A- in Honors Physics and the recommendation of the teacher. Concurrent CL Calculus BC. Students enrolled in CL Calculus AB that are interested in the course should apply to the department in advance for permission.*

Cancer Immunology 1 (1.0 Credit): This course focuses on a range of essential techniques widely used in research laboratories, encompassing both prokaryotic and eukaryotic cell culture methods, advanced nucleic acid technologies, and comprehensive protein purification processes. Additionally, it covers the practical aspects of operating and maintaining key laboratory instruments. By the end of this course, students are expected to gain not only a theoretical understanding but also practical skills in these areas. They will demonstrate their proficiency through a series of hands-on experiments, detailed laboratory practical assessments, and the presentation of their research proposals. This is a

two-semester year long course. *Prerequisite: B+ in Biology or departmental approval.*

Cancer Immunology 2 (1.0 Credit): During the second year as investigators, students will continue to develop the research project they began in the previous year, deepening their understanding and expertise. The curriculum is designed to sharpen their technical and analytical skills through regular skills checks, ensuring continuous progress and mastery of techniques. A key component of the course is peer mentorship, where students will guide and support first-year students, enhancing their own learning experience while fostering a collaborative scientific community. The program culminates in an end-of-year poster presentation, where students will showcase their research findings, demonstrating their ability to conduct and communicate complex scientific research. This is a two-semester year long course. *Prerequisite: Cancer Immunology and a well-established research project.*

CL Cancer Immunology (1.0 Credit): During the third year as investigators, students will delve deeper into their ongoing research projects, gaining a more profound understanding of complex scientific concepts and methodologies. This year is dedicated to honing their research skills and theoretical knowledge, ensuring they are well-prepared for advanced scientific inquiries. Students will also take on a more significant role in mentoring, providing guidance and support to both first and second-year students, thereby enhancing their leadership and teaching skills. The program culminates in two major deliverables: a comprehensive poster presentation and a detailed research paper. The poster showcases their findings in a concise, visual format, while the research paper requires in-depth analysis and critical thinking, reflecting their contribution to the field. This is a two-semester year long course. *Prerequisite: Successful completion of Honors Cancer Immunology and a research project that demonstrates promising data through a well-substantiated poster presentation.*

Ecological Sustainability (.5 Credit): This course explores the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. With a focus on community dynamics, students will begin to understand the delicate balance of factors seen in different terrestrial ecosystems. Students are asked to examine and analyze environmental problems, both natural and human-made, related to abiotic factors and other organisms. Students in this course are exposed to the social and environmental implications of consumer behaviors, population patterns and associated geopolitical implications. These impacts are analyzed in class discussion and writing assignments for their impact on climate change. Concepts and skills are applied to campus, regional, national, and international contexts. The course is designed to be taken as a semester elective or a year-long course, with different topics covered each semester. *Prerequisite: Biology and Chemistry.*

Astronomy (.5 Credit): This course offers an immersive exploration of celestial phenomena, spanning from the inception of the universe with the Big Bang to humanity's prospective colonization of Mars. Prior knowledge in algebra, biology, chemistry, and physics will be applied as we delve into the intricate dynamics of planetary systems, the life cycles of stars, and the enigmatic mysteries of distant galaxies. Students will uncover the historical significance and future implications of astronomical discoveries, engaging with interactive simulations, projects, lectures, and discussions on topics such as black holes, planetary exploration, and the search for extraterrestrial life. This cosmic expedition will foster not only a deep comprehension of celestial bodies but also critical thinking skills to assess the evolving role of humanity within the universe. Students will attend evening observation sessions at the school's Frost Observatory. The course is designed to be taken as a semester elective or a year-long course, with different topics covered each semester. *Prerequisite: Physics concurrent and Math 31 or higher.*

CL Synthetic Biology 1 - Invention and Design (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 manipulating microbes, students become adept scientific literature researchers and creative problem solvers. Students work collaboratively to generate ideas, design solutions, and identify research supporting them. The goal of this course is a

solid and well-vetted design of an invention ready for publication. This is a two-semester year-long course. *Prerequisite: An A in Biology or departmental approval.*

CL Synthetic Biology 2 - Bioengineering and Piloting (1.0 Credit): This full-year course immerses students in the cutting-edge convergence of biology, engineering, and invention known as synthetic biology. Over the year, students learn to source materials and build their formalized inventions from Synthetic Biology I while honing their biotechnology and bacteriology skills. As students build their inventions, they understand the complexity of gene regulation and expression - the ins and outs of how organisms read DNA to create a product. Students aim to complete a fully functional build by the year's end, with their build documented and submitted for publication. This is a two-semester year-long course. *Prerequisite: Successful completion of Synthetic Biology I.*

Ocean Topics (.5 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 and Chemistry.*

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 such as "what is it to be human?". 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. The course applies a comparative lens to a selective survey of world cultures examining the political, economic, social and cultural changes that developed through the vehicle of revolution. The teaching of skills will include the analysis of both primary and secondary sources, to acquiring geographical knowledge and learning research methodology. In the second semester, students will conduct a major research project on a modern topic of their choosing which culminates in a research paper, teaching session, and participation in a poster conference featuring their research subjects.

United States History and Government (1.0 Credit): This course, required for juniors, uses renowned historian Eric Foner's text, "Give Me Liberty," to examine the concept of freedom and the creation of being American. The course starts in the settler colonial period and looks at policies, both international and domestic, that led to America becoming a complex representation of democracy. Students will better understand the global forces and interactions that have affected our nation's people, influenced its institutions, and shaped its ideals. Emphasis will also be placed on gaining a better understanding of citizenship and the incumbent responsibilities of being a member of a democratic republic. The course emphasizes the analysis of primary sources, databases of historical documents, and the interpretations of historians like Foner. Students will produce essays and creative historical work such as research papers, magazine layouts and podcasts throughout the year.

CL United States History and Government (1.0 Credit): This course, intended for juniors but open to seniors, requires departmental recommendation. 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. A clear emphasis is placed on understanding the essence and evolution of American democracy. 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:* An 'A' or higher in BMW and departmental recommendation or permission.

CL Art History/Art History: Modern (.5 credit): This course focuses on artistic achievements of the 20th and 21st centuries through the lens of modern painting, architecture, photography, installation

art, and innovative materials art (working with non-traditional materials such as plastics, recyclables, string, cardboard, coins; the list is endless!). From Picasso to Zaha Hadid to Ai Wei, we will study the mavericks of the art world and how they have created modern aesthetics. Those enrolled as CL students should expect heavier assignment/assessment requirements.

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. This is a two-semester year long course. Open to juniors, seniors and PGs.

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. This is a two-semester year long course. Open to seniors and PGs. *Prerequisites: an A in both US History and Angles in Writing.*

CL Ethics (.5 Credit): As is the case with all the various branches of philosophy, ethics frames itself around one central question: How should I live my life? This course engages with this question through an examination of principal ethical traditions: honor ethics, Stoicism, Aristotelian virtue ethics, sentimentalism, utilitarianism, Kant’s practical philosophy, Nietzsche’s critique of morality, Buddhist ethics, and feminist ethics. As we consider these “classical” texts, we shall all the while consider how these traditions continue to inform our contemporary life. *Prerequisites: A in both US History and Angles in Writing. (This course is run as dual-credit in conjunction with oversight from Kenyon College faculty).*

CL African American Studies 1 (.5 Credit): This course will examine the Black experience in America from the inception of the United States through Reconstruction. An interdisciplinary approach will be taken with a variety of sources being used from historical documents to literary works, musical pieces, and various forms of art. Students will learn about the origins of the African Diaspora and the enslavement that followed, as well as resistance and the abolition of slavery that eventually came to be. Throughout these difficult centuries, Africans and Black Americans developed a distinctive culture that allowed for expression, action, and the melding of old and new traditions. *Prerequisite: Completion of US History.*

CL African American Studies 2 (.5 Credit): This course will focus on the establishment of Black citizenship, rights and power. From the creation of new cities and industrialization, Black colleges and universities, and the dedicated women and men who challenged the status quo to fight for civil rights, students will learn about the modern Black experience. The writings, speeches and work of Black activists, poets, authors, and artists may all be employed to examine the richness and complexity of

modern African American culture. Students will also contemplate the work yet to be done in order for Black Americans to have full access to the American Dream. *Prerequisite: Completion of US History.*

CL Frederick Douglass (.5 Credit): This course uses the writings of Frederick Douglass and other contemporary primary sources to examine the work and impact of this iconic writer and abolitionist who once spoke in our school's Chapel. Students will work closely with his texts and engage in research projects related to this important figure and period of American history. *Prerequisite: Completion of US History.*

Anthropology of Food Systems (.5 Credit): This course examines the way in which humanity has fed itself starting with the use of fire in hunter/gatherer societies and moving through agricultural developments, such as plowing, and the commercialization of food and development of agribusiness and laboratory foods. The course will use historical documentation, archaeological evidence, nutrition studies, scientific studies, cultural memoirs and artistic representations to look at how foodways are interwoven into our daily cultural fabric. We will also meet with local butchers, farmers, and purveyors of foodstuffs to hear about their goals and challenges as they work in the current food system. As a final class project we will create a collaborative cookbook/memoir filled with recipes that consider heritage, affordability, accessibility, sustainability and healing.

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.

International Relations (.5 credit): How can we understand the challenges modern powerful nations face in advancing their interests, security, and ambitions? How do rapid changes in global strategic, economic, and geopolitical environments challenge nations to preserve their threatened standing or to seek opportunistic advancement? This class will employ conceptual tools to understand the nature of superpower rivalry, both past and present. The course uses case studies and scenarios to develop decision-making skills in real world situations. It will focus on America's involvement in international relations and important foreign policy decisions beginning with World War One, moving through the Cold War, and then focusing on Post-9/11. This course prepares students to analyze and respond to assertions made about U.S. foreign policy and to posit foreign policy plans for a selected countries or regions.

Introduction to Geography and GIS (.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. The course also introduces students to Geographic Information Systems (GIS). GIS transforms static maps into dynamic and interactive multimedia and reflects the integration of technological innovation and vast amounts of geographic data. Students will learn the use of ArcGIS to process location-based data and apply spatial thinking.

Introduction to Law (.5 Credit): This course will examine the role of law in our society, the structure of the American legal system, civil and criminal trial procedure, selected issues of constitutional law, aspects of business law and criminal law/juvenile justice. The goal of the course is to give students

an overview of foundational legal principles, many of which are taught in core courses taken by law school students in their first year of law school. This course may also prepare students to participate in a statewide high school mock trial competition that is sponsored by the Ohio Center for Law-Related Education (<http://www.ocltre.org>). Students will assume the role of either lawyer or witness in a trial that is based on a hypothetical case file. The trial will consist of opening statements, direct and cross-examination of witnesses, and closing arguments.

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, geter-done kind of class!

Mock Trial (.5 Credit): This course will prepare students to participate in a statewide high school mock trial competition that is sponsored by the Ohio Center for Law-Related Education (<http://www.ocltre.org>). Students will assume the role of either lawyer or witness in a trial that is based on a hypothetical case file. The trial will consist of opening statements, direct and cross-examination of witnesses, and closing arguments. The mock trial competition will take place on selected days during the spring semester (January-March), and students must be available to participate in the competition. Class size is limited to 18 students.

Political Science & US Government (.5 Credit): This course is designed to introduce political science for students who are new to the study of politics as a discipline. The course consists of two semesters that can be taken together or separately. We will explore the scope of political science as a field of inquiry, the methods used by political scientists and provide a broad introduction to the field of political science to sort through and develop informed opinions about a variety of political topics. In addition, the course will focus on the substance of politics, including the roles played by states, organizations, and institutions, as well as their interactions, public policy, and international relations. In the first semester, the focus will be on how the design of the United States Government, how it dealt with Native American tribal power, how it shifted from colonies to states, and how a union was crafted and preserved.

Political Science & Comparative Government (.5 Credit): This course surveys key concepts and major theoretical contributions in the field of comparative politics, including the challenges for democratization and democratic consolidation, the possibility of revolution, how countries vary in their political and electoral institutions, and the power of social forces such as ethnicity, culture, and social capital. Country cases are drawn from different regions of the world and historical periods to ground students in the tools of comparative analysis and offer an international lens through which to view political science.

Psychology (.5 Credit): Why do humans behave as they do? Are we our thoughts? Students will formulate their answer to these questions while gaining a foundational understanding of the biological basis behavior, sensation, perception and memory. Students will end the semester investigating cognitive psychology by focusing on the inner workings of the human mind. The course will explore how people process, solve problems, learn and make decisions in their everyday life. Students will demonstrate their learning through cumulative quizzes, analysis of psychological research, and their own experiments. For the second semester offering, students will tackle the following essential questions: Which is the most influential nature or nurture in terms of human behavior? What does it mean to be mentally healthy versus mentally ill? Students will formulate their answers to these questions while gaining a foundational understanding of developmental, social, and clinical psychology. The course will discuss theories of emotion, personality, and psychodynamics. Students will demonstrate their learning through cumulative quizzes, analysis of psychological research, and their own experiments.

World Religions: East (.5 Credit): This course will take a project-based, interactive, discussion-style, and experiential approach to the study of the major Religions of the East, as well as some minor ones. Students will study and discuss the core ideas and beliefs of Buddhism, Hinduism, and Taoism. We will also experience religious practices in a relaxed yet respectful manner. For instance, when studying Hinduism students will practice different forms of Hindu yoga; for Buddhism students will learn formal Buddhist meditation and also construct a Tibetan sand mandala; and for Taoism, students will learn various forms of Tai Chi and Qi Gong practices. The class will include various guest speakers and field trips to immerse students in authentic beliefs and practices.

World Religions: West (.5 Credit): This course will examine the Abrahamic religions of Judaism, Christianity, and Islam; however, students will also study aspects of other religious and belief systems such as Wiccan Witchcraft, Native American religions, African religions, and Haitian Vodun. Again, the course will involve experiential learning as students encounter both religious texts and practices. The year will end with students leading a community-wide panel discussion on World Religions in today's world.

1968 - The Unraveling of America (.5 Credit): The Vietnam War, protests and assassinations were on the news. Peace signs, love-ins, Andy Warhol's pop art, and psychedelic rock were on the scene. There were assertions of Black Power at the Olympic Games and feminist demonstrations at the Miss America pageant. The social forces that swirled through the turbulent 1960s crested in 1968. It was a turning point for a generation coming of age and a nation at war. From the darkest hours to the incredible highs, the year 1968 comes alive in this interdisciplinary history elective. Exploring topics that range from generational conflict and counterculture to race and gender, this course aims to improve students' ability to analyze textual and visual sources critically, write clearly and coherently, and articulate their thoughts confidently.



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 Reserve Writing Exam.

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

ENGINEERING & APPLIED SCIENCE: (2 credits) Including Engineering and Fabrication (Grade 9), Health Science & Wellness and Learn to College.

MATHEMATICS: (4 credits) Four years of mathematics including one credit at Algebra 2/Level 30 or higher.

MODERN & CLASSICAL LANGUAGES: (2 credits) with completion of level three of a language.

SCIENCE: (3 credits) Biology, Chemistry and Physics required.

SOCIAL SCIENCE: (3 credits) US History and Government.

PHYSICAL EDUCATION: Athletic participation or conditioning each academic year required.