# Maricopa Institute of 

## Technology Course Catalog

An Advanced STEM Institute
3900 South 55 th Avenue Phoenix, AZ 85043


## Welcome to MIT!

Maricopa Institute of Technology (MIT) is a four year, public charter high school in Phoenix that offers all students a $21^{\text {st }}$ century focus in STEM (Science, Technology, Engineering, and Mathematics).

MIT offers a trend-setting academic program, including advance placement courses and dual credit offerings in business, engineering, technology, nanotechnology, mathematics, biology, physics, and English. Because MIT is a high school with a STEM focus, you will find that technology is embedded throughout the different curricula in the school. You will also find technology in every classroom and research lab.

MIT students and staff concentrate on $21^{\text {st }}$ century learning, including but not limited to, critical thinking, complex problem solving, collaboration with peers in school and with professionals in the community business settings, and technology enhanced by presentations geared for both small and large groups.

MIT curricula makes learning relevant to students, thus helping them connect their high school experiences to their future goals and interests. In addition to the varied curricula, co-curricular experiences are made available to our students to extend their learning and teamwork introduced in the classroom setting.

At MIT, our students and staff are committed to excellence and growth. In addition to working together in a professional learning environment, our staff reaches out and creates partnerships with businesses in the community. Staff members enrich their own professional development through real-world application of their curricula, and students engage in off-campus work/study opportunities, for the opportunity to apply their learning in real life settings. When students recognize how their learning connects to real scenarios, they become motivated, enriched and fulfilled.

Thank you for selecting MIT!

## MIT Headmaster

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| SUBJECT | Freshman | Sophomore | Junior | Senior |
| :---: | :---: | :---: | :---: | :---: |
| ENGLISH | English 1 <br> English 101 (Pre-AP) | English 2 <br> English 102 (Pre-AP) | English 3 <br> English 103 (AP) <br> AP English Language and Composition | English 4 <br> English 104 (AP) <br> AP English Literature and Composition |
| Computer Science/ Technology | Intro to Computer Science, Computer Programming and Game Design | Intro to Computer Science, Computer Programming and Game Design | Intro to Computer Science, Computer Programming and Game Design, AP Computer Science | Computer Programming and Game Design, AP Computer Science |
| SOCIAL STUDIES | Pre-AP World History 1-2 Online Pre-AP U.S. History Online | AP World History 1-2 Online Pre-AP U.S. History Online | AP U.S. History 1-2 (Online) <br> AP U.S. Government (Online) | AP U.S. Government, AP Macroeconomics or AP Microeconomics (Online or Dual Enrollment) |
| WORLD LANGUAGE | Spanish1, French1, Latin1, German1, Japanese1, or Chinese-Mandarin 1 | Spanish2, French2, Latin2, German2, Japanese2, or Chinese Mandarin 2, | Spanish 3, French 3, German 3, | AP Spanish, AP French, AP German |
| MATH | Pre-AP Algebra 1, Pre-AP Geometry, Pre-AP Algebra 2, Pre-Calculus/Trig | Pre-AP Geometry, <br> Pre-AP Algebra 2 <br> Pre-Calculus/Trig <br> AP Calculus AB | Pre-AP Algebra 2, PreCalculus/Trig, AP Statistics AP Calculus AB/BC, Multivariable Calculus \& Differential Equations | AP Statistics <br> AP Calculus AB/BC, Multivariable Calculus \& Differential Equations |
| ENGINEERING | Engineering I Engineering II | Engineering I, Engineering II, Introduction to Engineering Design | Introduction to Engineering Design, Intro to Computers and Engineering Problem Solving, | Civil \& Environmental Engineering Design Environmental Engineering and Sustainable Design |
| Science | Pre-AP Biology Pre-AP Inquiry Physics | Pre-AP/AP Biology Pre-AP Chemistry Pre-AP Inquiry Physics | AP Biology Pre-AP/AP Chemistry AP Physics 1 Bio Tech 1 | AP Chemistry <br> AP Environmental Science AP Physics 1 / 2 Bio Tech 2 |
|  <br> Career <br> Readiness | Advisory-Character Counts, Career and College Preparation | Advisory-Character Counts, Career and College Preparation | Career and College <br> Preparation Seminars, Service <br> Learning, Internships | Career and College <br> Preparation Seminars, Service Learning, Internships |
| STEM <br> Research LABS | STEM Internship, Seminars | STEM Internship, Seminars | Forensics and Psychology Human Anatomy \& Physiology, <br> AP Environmental Engineering and Sustainable Design, Stem Internships, Seminars | Human Anatomy \& Physiology, Global Engineering, Biomedical Engineering, Stem Internships, Seminars |
| Fine Arts/Electives (Online) | P.E., Health, Driver Safety, Journalism, Public Speaking, Creative Writing, Achieving your Career and College Goals, Nutrition \& Wellness, Earth Science. | Music Appreciation, Personal Finance, AP Art History, 3D Art Modeling, Digital Art 1, Intro to Culinary Art, Archeology, Astronomy, Veterinary Science, Health Sciences, Digital Photography | Image Design, Law and Order, Accounting, 3D Art 2, Intro to Agri-science, Political Science, Audio Engineering, Digital Art 2, Civics | Intro to Entrepreneurship, Intro to Marketing, International Business, Sports \& Entertainment Marketing |

Graduation \& University Requirements

| SUBJECT | Az HS Req. | Maricopa Institute of Technology | UNIVERSITY REQUIREMENTS |
| :---: | :---: | :---: | :---: |
| LANGUAGE ARTS | 4 credits | 4 Credits <br> STEM: English 101 Pre AP, 102 Pre-AP, 103 (AP), 104 (AP) | All Universities: 4 |
| Career \& Technical/FINE ARTS | 1 credit | 2 Credits <br> STEM: Engineering 1- 2, Intro to Computer Science, Computer Programming and Game Design | Minimum: 1 <br> Competitive Art <br> Universities: 2-3 |
| SOCIAL STUDIES | $3$ <br> Credits | 3 Credits <br> STEM: AP U.S. History 1-2, AP World History 1-2, AP U.S. <br> Government, AP Macro or Microeconomics | Minimum: 2 <br> Competitive <br> Universities: 3-4 |
| WORLD LANGUAGE | NA | 2 Credits (Two years of the same language) <br> STEM: Spanish, Chinese-Mandarin, French, Latin, Japanese, German | Minimum: 2 <br> Competitive <br> Universities: 3-4 |
| MATH | 4 credits | 4 Credits <br> STEM: Pre-AP Algebra 1, Geometry, Algebra 2, AP Statistics, AP Calculus AB, AP Calculus BC | Minimum: 4 Competitive University: 3-4 |
| SCIENCE | $3$ credits | 4 Credits (Biology Required) <br> STEM: Pre-AP Inquiry Physics, Pre-AP/AP Biology, Pre-AP/AP Chemistry, AP Physics | Minimum: 2 <br> Competitive <br> Universities: 3-4 |
| Culminating Project | NA | . 5 credit <br> Senior Year Project | NA |
| College \& Career Preparation | NA | 1 credit <br> STEM: Labs \& Senior Internship | *testing requirements <br> (ACT, SAT, SAT <br> Subject Test requirements, etc.) |
| Required Courses | 15 | 20.5 | 15 |
| ELECTIVE Courses | 7 credits | 1.5 Credits <br> Anatomy \& Physiology, Forensics, Advanced Math, AP Computer Programming, Stem Internships, Biotechnology, AP Environmental Science | NA |
| LITERACY \& LANGUAGE STANDARDS | NA | 3 Essays: Literary Analysis, Persuasive \& Cause-Effect/Compare- <br> Contrast (Multiple opportunities offered in core classes) | NA |
| MATHMATICAL \& SCIENTIFIC REASONING STANDARDS | NA | STEM: (Multiple opportunities in Technology \& Science courses) Anatomy \& Physiology, Forensics, Biotechnology, Advanced Math, AP Environmental Science, Internships, etc. | NA |
| HIGH SCHOOL PROFICIENCY EXAMS |  | Arizona Postponed State Testing due to COVID-19 |  |
| High School \& Beyond |  | Completed in Senior Year Labs/Internships |  |
| TOTAL CREDITS |  | 22 Credits |  |

## OVERVIEW: College \& Career Pathways

MIT Academic Program of Study is a comprehensive, structured approach for delivering academic and career and technical education to prepare students for postsecondary education and career success. MIT students apply engineering, science, math, and technology to solve complex, openended problems in a real world context.

The MIT Program of Study includes:

- secondary and postsecondary elements;
- coherent and rigorous content aligned with challenging academic standards and relevant career and technical content;
- opportunity for secondary students to participate in dual or concurrent enrollment courses or other ways to acquire postsecondary credit;
- pathway to an industry recognized credential or certificate at the postsecondary level or an associate or baccalaureate degree.


## Science Program of Study in Biology or Physics

Biology - The objective of MIT's Biology Program of Study is to give students strong preparation for the health professions. The program is designed to provide students broad opportunities to study advanced topics in biology or physics, in the classroom and by participating in internships and research projects.

| Biology |
| :---: |
| Pre-AP Biology, AP |
| Biology, Pre-AP |
| Chemisty, Human |
|  |
| Physiology |


| Physics |
| :---: |
| Inquiry Physics, |
| Pre-AP Chemistry, |
| AP Chemistry, AP |
| Physics, |
| AP Environmental |
| Science |

Technology/Computer Science - Computer Information Systems at MIT emphasize the use of computers as sophisticated problem-solving tools. Students pursue an interdisciplinary course of study that combines a solid foundation in computer science with a focus in another discipline. The program is designed for students who seek to blend their computer science abilities with a natural science focus.
Computer
Science/Technology

Engineering-MIT students engage in open-ended problem solving, learn and apply engineering design process, and use the same industry-leading technology and software used in the world's top companies. Students are immersed in design as they investigate topics such as forces, structures, aerodynamics, digital electronics and circuit design, manufacturing, and the environment, which will give them an opportunity to learn about different engineering disciplines before beginning postsecondary education or careers.


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Engineering 1-2, 3-4
Engineering & Problem Solving
Robotics and Mechatronics
Nanotechnology & Materials Engineering
Civil Engineering & Materials
Research, Design & Project Management
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Mathematics - MIT students make connections to the professional world in their math courses. The courses challenge students to solve problems in class and in the broader arena. It inculcates five Process Standards essential for developing deep understanding of mathematics: Problem Solving, Reasoning and Proof, Communication, Connections, and Representation.

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Pre-AP Algebra 1, 2
Pre-AP Geometry
Pre-Calculus/Trig
AP Calculus AB/BC
AP Statistics
Multivariable Calculus/Differential Equations
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English - ELA skills are critical for all MIT students, especially those considering a future STEM career. MIT students will involve themselves in challenging ELA courses that allow them to be able to communicate clearly and persuasively using documented support and to read and understand complex information. MIT can develop a rocket scientist and guarantee he can effectively communicate that knowledge to others.

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English 1, 2, 3, }
Pre-AP English 101
Pre-AP English }10
English 103 --AP English Language &
Composition
English 104--AP English Literature &
Composition
Journalism--Literary Magazine
Journalism--Yearbook
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World Languages - Through world language learning, MIT learners develop literacy with a balance of informational and literary texts, use their second language to access, discuss and create content across all disciplines, access increasingly complex texts, provide text-based answers, write from sources to explain, persuade, and convey experience, and build academic language.

Spanish 1, 2, 3 \& AP Spanish
French 1, 2, 3 \& AP French
Latin 1 \& 2
German 1, 2, 3, 4
Mandarin Chinese 1 \& 2
Japanese $1 \& 2$

## SPECIFIC COURSE DESCRIPTIONS

## ENGLISH

English 101-1 Credit (Pre-AP)
Prerequisite: Current Freshman
Pre-Advanced Placement LITERARY ANALYSIS AND COMPOSITION I /This course challenges students to improve their written and oral communication skills, while strengthening their ability to understand and analyze literature in a variety of genres. Students work on independent projects that enhance their skills and challenge them to consider complex ideas and apply the knowledge they have learned. With literature, students read a broad array of short stories, poetry, drama, novels, autobiographies, essays, and famous speeches. The course guides students in annotating and critical analysis of classic works of literature and helps them appreciate these texts and their contexts. Literary selections range
from the Greek tragedy Antigone to Shakespeare's Romeo and Juliet to contemporary pieces by authors such as Annie Dillard and Maya Angelou. Language Skills: Students broaden their composition skills by examining model essays in various genres by student and professional writers. Through in-depth planning, organizing, drafting, revising, proofreading, and feedback, they hone their writing skills. Students build on their grammar, usage, and mechanics skills with in-depth study of sentence analysis and structure, agreement, and punctuation, all reinforced by online activities. Student vocabulary is enhanced through the study of Greek and Latin root words, improving students' ability to decipher the meanings of new words. Course Length: Two semesters.

## English 102-1 Credit (Pre-AP)

Prerequisite: Current Sophomore
Pre-Advanced Placement LITERARY ANALYSIS AND COMPOSITION II / In this course, students build on existing literature and composition skills and advance to higher levels of sophistication. Students work on independent projects that enhance their skills and challenge them to consider complex ideas and apply that knowledge. Literature: Students hone their skills of literary analysis by reading short stories, poetry, drama, novels, and works of nonfiction, both classic and modern. Authors include W. B. Yeats, Sara Teasdale, Langston Hughes, Robert Frost, Edgar Allan Poe, Nathaniel Hawthorne, Kate Chopin, Amy Tan, Richard Rodriguez, and William Shakespeare. Students have a choice of novels and longer works to study, including works by Jane Austen, Charles Dickens, and Elie Wiesel. Language Skills: In this course, students become more proficient writers and readers. In composition lessons, students analyze model essays from readers' and writers' perspectives, focusing on themes and content, structure and organization, style, word choice, and tone. Students receive feedback from the teacher and peers during the writing process to help them work toward a polished final draft. In addition to writing formal essays, resumes, and business letters, students write and deliver a persuasive speech. Furthermore, students expand their knowledge of grammar, usage, and mechanics through sentence analysis and structure, syntax, agreement, and conventions. Unit pretests identify skills to address more fully. Students also strengthen their vocabulary knowledge through thematic units focused on word roots, suffixes and prefixes, context clues, and other important vocabulary-building strategies. Course Length: Two semesters.

## English 103-1 Credit (AP) - English Language and Composition <br> Prerequisite: Current Junior

ADVANCED PLACEMENT ENGLISH LANGUAGE AND COMPOSITION / Students learn to understand and analyze complex works by a variety of authors. They explore the richness of language, including syntax, imitation, word choice, and tone. They also learn composition style and process, starting with exploration, planning, and writing. This focus continues with editing, peer review, rewriting, polishing, and applying what they learn to academic, personal, and professional contexts. In this equivalent of an introductory college-level survey class, students prepare for the AP exam and for further study in communications, creative writing, journalism, literature, and composition. Course Length: Two semesters.

## English 104 Credit (AP) - English Literature and Composition <br> Prerequisite: Current Senior

ADVANCED PLACEMENT ENGLISH LITERATURE AND COMPOSITION / In this course, the equivalent of an introductory college-level survey class, students are immersed in novels, plays, poems, and short stories from various periods. Students read and write daily, using a variety of multimedia and interactive activities, interpretive writing assignments, and discussions. The course places special emphasis on reading comprehension, structural and critical analysis of written works, literary vocabulary, and recognizing and understanding literary devices. Students prepare for the AP Exam and for further study in creative writing, communications, journalism, literature, and composition.

## Course Length: Two semesters.

## Social Studies -

## AP US History- 1 Credit <br> Prerequisite: Current Junior

AP U.S. HISTORY / Students explore and analyze the economic, political, and social transformation of the United States since the time of the first European encounters. Students are asked to master not only the wide array of factual information necessary to do well on the AP exam, but also to practice skills of critical analysis of historical information and documents. Students read primary and secondary source materials and analyze problems presented by historians to gain insight into challenges of interpretation and the ways in which historical events have shaped American society and culture. The content aligns to the sequence of topics recommended by the College Board and to widely used textbooks. Students prepare for the AP exam. By the end of these additional assignments, students will have learned relevant and applicable skills to address the AP themes and be familiar with the AP exam by studying released exams and responses. Students may potentially receive credit and/or advanced placement from the university they plan to attend depending on the score they earn on the AP Exam.

## Course Length: Two semesters.

## AP Macroeconomics - 0.5 Credit

## Prerequisite: Current Senior

This course is the equivalent of an introductory college-level course. Students learn why and how the world economy can change from month to month, how to identify trends in our economy, and how to use those trends to develop performance measures and predictors of economic growth or decline. Students also examine how individuals and institutions are influenced by employment rates, government spending, inflation, taxes, and production. Students prepare for the AP exam and for further study in business, political science, and history.

## Course Length: One semester.

## AP U. S. Government - 0.5 Credit

## Prerequisite: Current Senior

This course is the equivalent of an introductory college-level course. Students explore the operations and structure of the U.S. government and the behavior of the electorate and politicians. Students gain the analytical perspective necessary to evaluate political data, hypotheses, concepts, opinions, and processes and learn how to gather data about political behavior and develop their own theoretical analysis of American politics. Students also build the skills they need to examine general propositions about government and politics, and to analyze specific relationships between political, social, and economic institutions. Students prepare for the AP exam and for further study in political science, law, education, business, and history.
Course Length: Two semesters.

## AP World History - 1 Credit

This course spans the Neolithic age to the present in a rigorous academic format organized by chronological periods and viewed through fundamental concepts and course themes. Students analyze the causes and processes of continuity and change across historical periods. Themes include human environment interaction, cultures, expansion and conflict, political and social structures, and economic systems. In addition to mastering historical content, students cultivate historical thinking skills that involve crafting arguments based on evidence, identifying causation, comparing and supplying context for events and phenomenon, and developing historical interpretation. Course Length: Two semesters.

Civics - 0.5 Credit
Prerequisite: Current Senior
This course is designed to prepare students to fulfill their role as citizens in a democratic society. This course examines the foundations of America's democratic traditions and how the nation has developed politically, economically, and socially from pre-colonial times to the present. Students will study political and economic documents that pertain to their STEM lab concentration. Major units of study include: Origins of the U.S. Government and Constitution; Political Parties, Elections, and Voting; Media and Interest Groups; the Legislative Branch; the Executive Branch; the Judicial Branch and Due Process; State and Local Government. By the end of this course students will have an understanding of the structure and function of the U.S. government as well as the rights and responsibilities of U.S. citizenship.

## Course Length: One semester.

## Political Science-0.5 Credit

## Prerequisite: Current Junior

This course is designed to evaluate the impact of the political systems on the societies from ancient times to today. Students will study political and economic documents that pertain to their STEM lab concentration. Students will examine competing philosophies about how best to produce, distribute and consume goods, services and resources. Students will explore the values and issues that go into public policy decisions. By the end of the year, students will be able to demonstrate knowledge of patterns of change over time in political systems and evaluate relationships between political ideals and historical and current realities. Course Length: One semester.

## AP MICROECONOMICS - Credit

Prerequisite: Current Junior
This course is the equivalent of an introductory college level course. Students explore the behavior of individuals and businesses as they exchange goods and services in the marketplace. Students learn why the same product can cost different amounts at different stores, in different cities, and at different times. Students also learn to spot patterns in economic behavior and learn how to use those patterns to explain buyer and seller behavior under various conditions. Lessons promote an understanding of the nature and function of markets, the role of scarcity and competition, the influence of factors such as interest rates on business decisions, and the role of government in the economy. Students prepare for the AP exam and for further study in business, history, and political science.
Course Length: One semester.

## World Languages

All world language courses have been carefully aligned to national standards as set forth by the American Council on the Teaching of Foreign Languages (ACTFL).

Spanish I- 1 Credit Prerequisite: None
Students begin their introduction to Spanish by focusing on the four key areas of world language study: listening, speaking, reading, and writing. The course represents an ideal blend of language learning pedagogy and online learning. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, participate in simple conversations and respond appropriately to basic conversational prompts, analyze and compare cultural practices, products, and perspectives of various Spanish-speaking countries, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## Spanish II-1 Credit Prerequisite: Spanish I/Instructor Approval

Students continue their study of Spanish by further expanding their knowledge of key vocabulary topics and grammar concepts. Students not only begin to comprehend listening and reading passages more fully, but they also start to express themselves more meaningfully in both speaking and writing. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, understand common vocabulary terms and phrases, use a wide range of grammar patterns in their speaking and writing, participate in conversations and respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various Spanish speaking countries, and take frequent assessments where their language progression can be monitored. By semester 2, the course is conducted almost entirely in Spanish. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages).

## Course Length: Two semesters.

## Spanish III- 1 Credit

Prerequisite: Spanish II/Instructor Approval
Students further deepen their understanding of Spanish by focusing on the three modes of communication: interpretive, interpersonal, and presentational. Each unit consists of a variety of activities which teach the students how to understand more difficult written and spoken passages, to communicate with others through informal speaking and writing interactions, and to express their thoughts and opinions in more formal spoken and written contexts. Students should expect to be actively engaged in their own language learning, use correct vocabulary terms and phrases naturally, incorporate a wide range of grammar concepts consistently and correctly while speaking and writing, participate in conversations covering a wide range of topics and respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various Spanish-speaking countries, read and analyze important pieces of Hispanic literature, and take frequent assessments where their language progression can be monitored. The course is conducted almost entirely in Spanish. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## AP SPANISH LANGUAGE AND CULTURE- 1 Credit

## Prerequisite: Spanish III/Instructor Approval

The AP Spanish Language and Culture course is an advanced language course in which students acquire proficiencies that expand their cognitive, analytical and communicative skills. It uses as its foundation the three modes of communication (Interpersonal, Interpretive and Presentational) as defined in the Standards for Foreign Language Learning in the 21st Century. The course is designed as an immersion experience and is conducted almost exclusively in Spanish. In addition, all student work, practices, projects, participation, and assessments are in Spanish. The course is based on the six themes required by the College Board: (1) global challenges, (2) science and technology, (3) contemporary life, (4) personal and public identities, (5) families and communities, and (6) beauty and aesthetics. The course teaches language structures in context and focuses on the development of fluency to convey meaning. Students explore culture in both contemporary and historical contexts to develop an awareness and appreciation of cultural products, practices, and perspectives. In addition, students participate in a forum where they are able to share their own opinions and comments about various topics and comment on other students' posts. The course also makes great use of the Internet for updated and current material. Course Length: Two semesters.

## FRENCH I-1 Credit

Students begin their introduction to French by focusing on the four key areas of world language study: listening, speaking, reading, and writing. The course represents an ideal blend of language learning pedagogy and online learning. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, participate in simple conversations and respond appropriately to basic conversational prompts, analyze and compare cultural practices, products, and perspectives of various French-speaking countries, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## FRENCH II- 1 Credit

## Prerequisite: French 1/Instructor Approval

Students continue their study of French by further expanding their knowledge of key vocabulary topics and grammar concepts. Students not only begin to comprehend listening and reading passages more fully, but they also start to express themselves more meaningfully in both speaking and writing. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, understand common vocabulary terms and phrases, use a wide range of grammar patterns in their speaking and writing, participate in conversations and respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various French speaking countries, and take frequent assessments where their language progression can be monitored. By semester 2, the course is conducted almost entirely in French. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## FRENCH III-1 Credit

Prerequisite: French II/Instructor Approval
Interpretive, interpersonal, and presentational, each unit consists of a variety of activities which teach students how to understand more difficult written and spoken passages, to communicate with others through informal speaking and writing interactions, and to express their thoughts and opinions in both formal and Informal spoken and written contexts. Students should expect to be actively engaged in their own language learning, use correct vocabulary terms and phrases naturally, incorporate a wide range of grammar concepts consistently and correctly while speaking and writing, participate in conversations covering a wide range of topics, respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various French-speaking countries, read and analyze important pieces of literature, and take frequent assessments where their language progression can be monitored. The course is conducted almost entirely in French. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages).
Course Length: Two semesters.

## AP FRENCH LANGUAGE AND CULTURE - 1 Credit <br> Prerequisite: French III/Instructor Approval

The AP French Language and Culture course is an advanced language course in which students are directly prepared for the AP French Language and Culture test. It uses as its foundation the three modes of communication: interpersonal, interpretive and presentational. The course is conducted almost exclusively in French. The course is based on the six themes required by the College Board: (1) global challenges, (2) science and technology, (3) contemporary life, (4) personal and public identities, (5) families and communities, and (6) beauty and aesthetics. The course teaches language structures in context and focuses on the development of fluency to convey meaning. Students explore culture in both contemporary and historical contexts to develop an awareness and appreciation of cultural products, practices, and perspectives. Students should expect to listen to, read, and understand a wide variety of authentic French-language materials and sources, demonstrate proficiency in interpersonal, interpretive, and presentational communication using French, gain knowledge and understanding of the cultures of the Francophone world, use French to connect with other disciplines and expand knowledge in a wide-variety of contexts, develop insight into the nature of the French language and its culture, and use French to participate in communities at home and around the world. The AP French Language course is a college level course. The intensity, quality, and amount of course material can be compared to that of a thirdyear college course. Course Length: Two semesters.

## GERMAN I-1 Credit

Students begin their introduction to German by focusing on the four key areas of world language study: listening, speaking, reading, and writing. The course represents an ideal blend of language learning pedagogy and online learning. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, participate in simple conversations, respond appropriately to basic conversational prompts, analyze and compare cultural practices, products, and perspectives of various German-speaking countries, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## GERMAN II- 1 Credit

Prerequisite: German I/Instructor Approval
Students continue their study of German by further expanding their knowledge of key vocabulary topics and grammar concepts. Students not only begin to comprehend listening and reading passages more fully, but they also start to
express themselves more meaningfully in both speaking and writing. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Students should expect to be actively engaged in their own language learning, understand common vocabulary terms and phrases, use a wide range of grammar patterns in their speaking and writing, participate in conversations, respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various German speaking countries, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## GERMAN III- 1 Credit

Prerequisite: German II/Instructor Approval
This course expands the scope of concepts and information that students mastered in the German I and II courses and aligns with national ACTFL standards. Students learn increasingly complex grammatical constructions, such as present, imperfect, perfect, and future tenses; reflexive and modal verbs; prepositions; conjunctions; relative pronouns; and adjective endings. Unit themes in this two-semester course include vacations, travel, leisure time, healthy living, body parts and ailments, family members, rights and responsibilities, household chores, university study, military service, personal relationships, the importance of appearance, emotions, fairy tales, and animals. Unit activities blend different forms of communication and culture. Course Length: Two semesters.

## GERMAN IV- 1 Credit

## Prerequisite: German III / Instructor Approval

German IV builds on the foundation of the first three courses. Students continue to sharpen their speaking, listening, reading, and writing skills while also learning to express themselves on topics relevant to German culture. Authentic texts, current culture, and literature from Germany, Austria, and Switzerland all form part of the instructional material for this course. Each unit focuses on a particular region or city and includes such themes as culture, tourism, and current events. These units cover topics such as contemporary and classical music, expressing opinion, German history, transportation, family weekend travel, shopping, free-time activities, technology, multiculturalism, education, and careers. Course Length: Two semesters.

## LATIN I-1 Credit

Since mastering a classical language presents different challenges from learning a spoken world language, students learn Latin through ancient, time-honored, classical language approaches which include repetition, parsing, written composition, and listening exercises. These techniques, combined with a modern multimedia approach to learning grammar, syntax, and vocabulary, provide students with a strong foundation for learning Latin. Each unit consists of a new vocabulary theme and grammar concept, reading comprehension activities, writing activities, multimedia culture, history, and mythology presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on engaging with authentic classical Latin through weekly encounters with ancient passages from such prestigious authors as Virgil, Ovid, and Lucretius. The curriculum concurs with the Cambridge school of Latin; therefore, students will learn ancient high classical styles of pronunciation and grammar in lieu of generally less sophisticated medieval styles, making it possible for students to comprehend the most Latin from the widest range of time periods. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, understand and analyze the cultural and historical contexts of the ancient sources they study, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## LATIN II- 1 Credit

Prerequisite: Latin 1/Instructor Approval
Students continue with their study of Latin through ancient, time-honored, classical language approaches which include repetition, parsing, written composition, and listening exercises. These techniques, combined with a modern multimedia approach to learning grammar, syntax, and vocabulary, prepare students for a deeper study of Latin. Each unit consists of a new vocabulary theme and grammar concept, reading comprehension activities, writing activities, multimedia culture, history, and mythology presentations, and interactive activities and practices which reinforce vocabulary and grammar. The emphasis is on reading Latin through engaging with myths from the ancient world which are presented in Latin. The curriculum concurs with the Cambridge school of Latin; therefore, students will learn ancient high classical styles of pronunciation and grammar in lieu of generally less sophisticated medieval styles, making it possible for students to comprehend the most Latin from the widest range of time periods. Students should expect to be actively engaged in their own language learning, understand and use common vocabulary terms and phrases, comprehend a wide range of grammar patterns, understand and analyze the cultural and historical contexts of the ancient sources they study, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## CHINESE I (Mandarin) - 1 Credit

Students begin their introduction to Chinese by focusing on the four key areas of world language study: listening, speaking, reading, and writing. The course represents an ideal blend of language learning pedagogy and online learning. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Both Chinese characters and pinyin are presented together throughout the course and specific character practices are introduced after the first quarter. Students should expect to be actively engaged in their own language learning, become familiar with common vocabulary terms and phrases, comprehend a wide range of grammar patterns, participate in simple conversations and respond appropriately to basic conversational prompts, analyze and compare cultural practices, products, and perspectives of various Chinese-speaking regions, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length:
Two semesters.

## CHINESE II-(Mandarin)-1 Credit

Prerequisite: Chinese 1/Instructor Approval
Students continue their study of Chinese by further expanding their knowledge of key vocabulary topics and grammar concepts. Students not only begin to comprehend listening and reading passages more fully, but they also start to express themselves more meaningfully in both speaking and writing. Each unit consists of a new vocabulary theme and grammar concept, reading and listening comprehension activities, speaking and writing activities, multimedia cultural presentations, and interactive activities and practices which reinforce vocabulary and grammar. There is a strong emphasis on providing context and conversational examples for the language concepts presented in each unit. Character recognition and practice are a key focus of the course and students are expected to learn several characters each unit. However, pinyin is still presented with characters throughout the course to aid in listening and reading comprehension. Students should expect to be actively engaged in their own language learning, understand common vocabulary terms and phrases, use a wide range of grammar patterns in their speaking and writing, participate in conversations and respond appropriately to conversational prompts, analyze and compare cultural practices, products, and perspectives of various Chinese-speaking regions, and take frequent assessments where their language progression can be monitored. The course has been carefully aligned to national standards as set forth by ACTFL (the American Council on the Teaching of Foreign Languages). Course Length: Two semesters.

## JAPANESE I- 1 Credit

Students become familiar with the fundamental concepts and constructions of the Japanese language as well as the rich and ancient world of Japanese culture in this two-semester course. Japanese I has been designed to meet the standards of the American Council on the Teaching of Foreign Languages (ACTFL). Unit topics consist of the alphabet and numbers; greetings; introductions; the calendar (days, months, and seasons); weather; time; colors; familiar objects and places; family; food; pastimes; and school objects and routine. Course strategies include warm-up activities, vocabulary study, reading, threaded discussions, multimedia presentations, self-checks, practice activities and games, oral and written assignments, projects, quizzes, and exams. Course Length: Two semesters.

## JAPANESE II-1 Credit

Prerequisite: Japanese I/Instructor Approval
In Japanese II, course content blends different forms of communication and culture via unit activities to ensure that students meet all standards of the American Council on the Teaching of Foreign Languages (ACTFL). These standards call for a focus on successful oral and written communication as well as a through grounding in Japanese culture. Unit themes for both semesters cover a broad range of useful everyday subjects, including daily routine, animals, entertainment, body parts, rooms and furniture, shopping and clothing, meals, sports and recreation, and transportation. Students must successfully complete Japanese I in order to enroll in this course. Course Length: Two semesters.

## Mathematics

The math courses are designed as a sequential pathway, laying the foundation for further mathematical study. Each course has a strong emphasis on applied problems and integrates engineering curriculum throughout the content.

## Geometry- 1 Credit (Pre-AP)

Prerequisite: None
Pre-Advanced Placement GEOMETRY /Students work with advanced geometric concepts in various contexts. They build in-depth ideas of inductive and deductive reasoning, logic, concepts, and techniques of Euclidean plane and solid geometry. They also develop a sophisticated understanding of mathematical structure, method, and applications of Euclidean plane and solid geometry. Students use visualizations, spatial reasoning, and geometric modeling to solve problems. Topics of study include points, lines, and angles; triangles; right triangles; quadrilaterals and other polygons; circles; coordinate geometry; three-dimensional solids; geometric constructions; symmetry; the use of transformations; and non-Euclidean geometries. Students work on additional challenging assignments, assessments, and research projects. Course Length: Two semesters.

## Algebra 1-1 Credit (Pre-AP) <br> Prerequisite: None

Pre-Advanced Placement ALGEBRA I / This course prepares students for more advanced courses while they develop algebraic fluency, learn the skills needed to solve equations, and perform manipulations with numbers, variables, equations, and inequalities. They also learn concepts central to the abstraction and generalization that algebra makes possible. Topics include simplifying expressions involving variables, fractions, exponents, and radicals; working with integers, rational numbers, and irrational numbers; graphing and solving equations and inequalities; using factoring, formulas, and other techniques to solve quadratic and other polynomial equations; formulating valid mathematical arguments using various types of reasoning; and translating word problems into mathematical equations and then using the equations to solve the original problems. Each semester also includes an independent honors project.

## Course Length: Two semesters.

## Algebra II - 1 Credit (Pre-AP)

Prerequisite: Successful completion of Algebra I
Pre-Advanced Placement ALGEBRA II / This course builds upon advanced algebraic concepts covered in Algebra I and prepares students for advanced level courses. Students extend their knowledge and understanding by solving openended problems and thinking critically. Topics include functions and their graphs; quadratic functions; complex numbers, and advanced polynomial functions. Students are introduced to rational, radical, exponential, and logarithmic functions; sequences and series; probability; statistics; and conic sections. Students work on additional challenging assignments, assessments, and research projects. Course Length: Two semesters.

## Pre-Calculus/Trigonometry-1 Credit

Prerequisite: Successful completion of Algebra II
PRE-CALCULUS/TRIGONOMETRY (COMPREHENSIVE) / Pre-calculus weaves together previous study of algebra, geometry, and functions into a preparatory course for calculus. The course focuses on the mastery of critical skills and exposure to new skills necessary for success in subsequent math courses. Topics include linear, quadratic, exponential, logarithmic, radical, polynomial, and rational functions; systems of equations; and conic sections in the first semester. The second semester covers trigonometric ratios and functions; inverse trigonometric functions; applications of trigonometry, including vectors and laws of cosine and sine; polar functions and notation; and arithmetic of complex numbers. Cross-curricular connections are made throughout the course to calculus, art, history, and a variety of other fields related to mathematics. Course Length: Two semesters.

## AP Statistics - 1 Credit <br> Prerequisite: Successful completion Algebra II/Instructor Approval

This course is the equivalent of an introductory college-level course. Statistics - the art of drawing conclusions from imperfect data and the science of real-world uncertainties - plays an important role in many fields. Students collect, analyze, graph, and interpret real-world data. They learn to design and analyze research studies by reviewing and evaluating examples from real research. Students prepare for the AP exam and for further study in science, sociology, medicine, engineering, political science, geography, and business. Course Length: Two semesters.

## AP Calculus AB 101 Credit

## Prerequisite: Pre-Calculus/Trigonometry/Instructor Approval

This course is the equivalent of an introductory college-level calculus course. Calculus helps scientists, engineers, and financial analysts understand the complex relationships behind real-world phenomena. Students learn to evaluate the soundness of proposed solutions and apply mathematical reasoning to real-world models. Students also learn to understand change geometrically and visually (by studying graphs of curves), analytically (by studying and working with mathematical formulas), numerically (by seeing patterns in sets of numbers), and verbally. Students prepare for the AP exam and further studies in science, engineering, and mathematics. Course Length: Two semesters.

## AP Calculus BC102-1 Credit

Prerequisite: Successful completion of AP Calculus AB 101
This course is the equivalent of an introductory college level calculus course. In this course, students study functions, limits, derivatives, integrals, and infinite series. Calculus helps scientists, engineers, and financial analysts understand the complex relationships behind real-world phenomena. Students learn to evaluate the soundness of proposed solutions and apply mathematical reasoning to real-world models. Students also learn to understand change geometrically and visually (by studying graphs of curves), analytically (by studying and working with mathematical formulas), numerically (by seeing patterns in sets of numbers), and verbally. Students prepare for the AP Exam and further studies in science, engineering, and mathematics. Course Length: Two semesters.

## Multivariable Calculus \& Differential Equations

This course is for student who have completed AP Calculus BC. The curriculum covers Calculus 3 and differential equations (DEQ). Students may get 4 credits for Multivariable Calculus and 3 credits for DEQ through dual enrollment.

## Engineering

The Engineering program educates and prepares students for leadership in industry, government, and educational institutions; to advance the knowledge base of the engineering professions; and to influence the future directions of engineering education and practice. The School's educational programs emphasize the understanding of fundamental principles; teach facility with experimental, computational, and analytical methods; and develop a versatility of mind that prepares the individual for a lifetime of learning and professional growth.

## Engineering I-1 Credit

Prerequisite: None
ENGINEERING DESIGN/CAD (ELECTIVE) / Computer-aided design systems are used by designers and manufacturers in virtually every industry to create engineering design solutions. In this course, students are introduced to engineering, learning the basics of CAD software: creating points, lines, other geometric forms, isometric drawings, and 3D models. They learn how to translate initial concepts into functional designs and 3D walkthroughs and explore career options in this hands-on introductory-level course. Course Length: One semester.

## Engineering II-1 Credit <br> Prerequisite: Engineering I

Picking up where Engineering / leaves off, this course is designed to build on the knowledge and skills acquired in the first year of engineering and to challenge students with more complex projects and more independent decision making. Hands-on and project-based, this course emphasizes the historic achievements and contemporary challenges of engineers, the engineering design process, and the skills and habits of mind that engineers find most essential in their work. Students will work in cooperative groups to address challenges ranging from automotive and mechanical engineering to electrical and energy system engineering. The course will culminate in an original design challenge, where students will have an opportunity to apply everything that they have learned in a project of their choice. Students will create formal presentations of their projects, appropriate for community sharing events and for science and engineering competitions. Course Length: One semester.

## Computer Science

## Introduction to Computer Science - 1 Credit

## Prerequisite: None

Introduction to Computer Science/This course introduces students to computer science concepts such as computer architecture, networks, and the Internet. Students use object-oriented programming, event-driven processes, modular computer programming, and data manipulation algorithms to produce finished software programs. They use the design process to create many programs by determining specifications, designing the software, and testing and improving the product until it meets the specifications. By the end of this course, students will have a solid foundation for further study in this subject. Students need to be problem solvers when working with technology as we try out new concepts and keep current with trends in the workforce.
Units will include web development, 3D printing, mobile app development and GIS tools for displaying data and investigative research. We will look at new tools for teaching the basics of programming as well. Students will demonstrate project based learning and teamwork in many of the assignments.
Two semesters and two major themes: Mobile and Web Development and Game Development.
Game Development will include theory and current events as well as creating arcade games with a platform and additional game programming through a host of resources available. The course provides rigor in terms of aligning with education and technological standards and providing real-life examples of gaming and the game industry issues.
Course Length: One semester.

## Computer Programming - I/II: 1 Credit

Prerequisite: None
Programming I-VB.NET (ELECTIVE) / Students learn basic programming and the essential concepts of VisualBasic.net (VB. NET) in this one-semester course. As an introduction to VB.NET, students are taught the basic uses of the programming language, its similarities to the English language and others, its architecture, program flow, and its flexibility as a programming language. The course helps participants understand the processes involved in software development and object-oriented programming. This is an introductory course that could lead to careers such as software engineer, developer, or game designer. Prior coursework in computer fundamentals is a prerequisite. Visual Studio 2008 Express Edition is required software for this course.
PROGRAMMING II—JAVA (ELECTIVE) / This introductory-level, one-semester course is designed for people who have very little programming experience. In Java Programming, students gain an understanding of Java platforms and learn how to build a stand-alone application, such as a countdown clock or leap year indicator. Students also learn the techniques of Java and how Java can be used in cross platform programming. At the end of the course, students are able to write basic programs using Java and are prepared to pursue further instruction in any programming language. Prior coursework in computer fundamentals and programming are prerequisites for Java Programming. JDK 1.5 or a higher version Java application is required for this course. Course Length: Two semesters.

## C++ Programming and Game Design

Prerequisite: Experience in object-oriented programming beneficial
Building on prior programming knowledge, this course has three components:

- Develop programming skills in VB.NET Programming using the C++ programming language. Topics include: C++ syntax, content, and structure. Console, Windows Forms, and Web applications. Event-driven programming, event-handlers, and the VB.NET library of classes.
- Application of C++ in the creation of games using XNA game development concepts.
- Independent programming project - Windows games, Xbox games, phone applications, Raspberry Pi, Gadgeteer as possible project ideas.


## Course Length: Two semesters.

## AP Computer Science/College Credit in the High School Computer Programming-1 Credit

Prerequisite: C\# and Game Design \& Recommended Completion of Math Analysis/Instructor Approval The Advanced Placement Program offers a course and exam in introductory computer science. The AP Computer Science A course is more than a course on programming. The emphasis in the course is on procedural and data abstraction, object-oriented programming and design methodology, algorithms, and data structures. AP is meant to be the equivalent of a first-semester college-level course in computer science. The course centers on projects that allow students to explore a broad range of fields that leverage programming. It is important that students understand that computer science builds upon a foundation of mathematical reasoning and written communication. Students should have acquired these prerequisite skills before attempting this course.

Successful completion of this course and its projects will prepare students for the AP exam. Students should be able to:

- design, implement and debug computer-based solutions to problems in diverse application areas
- use, implement and analyze common algorithms and data structures
- write clear and efficient code using good Java syntax and programming style
- know when and how to use Java library classes
- read, understand and contribute to large programs consisting of several classes
- identify and discuss the major hardware and software components of a computer system
- recognize the ethical and social implications of computer use and software creation

The coursework covered in this class is designed for anyone interested in getting a jump start for college careers in computer science or computer engineering. The class content is college level work. Course Length: Two semesters.

## Science

## Pre-AP Inquiry Physics- 1 Credit

Prerequisite: Current Freshman
Pre-Advanced Placement PHYSICS / This advanced course surveys all key areas: physical systems, measurement, kinematics, dynamics, momentum, energy, thermodynamics, waves, electricity, and magnetism, and introduces students to modern physics topics such as quantum theory and the atomic nucleus. Additional honors assignments include debates, research papers, extended collaborative laboratories, and virtual laboratories. The course gives a solid basis for moving on to more advanced college physics courses. The program consists of in class and online instruction, in class research and virtual laboratories, and related assessments, plus an associated problem-solving book.
Course Length: Two semesters.

## Pre-AP Biology- 1 Credit

## Prerequisite: Current Freshman

Pre-Advanced Placement BIOLOGY / This course provides students with a challenging honors-level biology curriculum, focusing on the chemistry of living things: the cell, genetics, evolution, the structure and function of living things, and ecology. The program consists of advanced in lab and online lessons including extensive animations, an associated reference book, collaborative explorations, and hands-on laboratory experiments students can conduct at home. Honors activities include debates, research papers, extended collaborative laboratories, and virtual laboratories.
Course Length: Two semesters.

## AP Biology - 1 Credit

This course guides students to a deeper understanding of biological concepts including the diversity and unity of life, energy and the processes of life, homeostasis, and genetics. Students learn about regulation, communication, and signaling in living organisms, as well as interactions of biological systems. Students carry out a number of learning activities, including readings, interactive exercises, extension activities, hands-on laboratory experiments, and practice assessments. These activities are designed to help students gain an understanding of the science process and criticalthinking skills necessary to answer questions on the AP Biology Exam. The content aligns to the sequence of topics recommended by the College Board.

## Course Length: Two semesters.

## Pre-AP Chemistry-1 Credit

Prerequisite: None
Pre-Advanced Placement CHEMISTRY / This advanced course gives students a solid basis to move on to more advanced courses. The challenging course surveys all key areas, including atomic structure, chemical bonding and reactions, solutions, stoichiometry, thermochemistry, organic chemistry, and nuclear chemistry, enhanced with challenging model problems and assessments. Students complete community-based written research projects, treat aspects of chemistry that require individual research and reporting, and participate in online threaded discussions. This course is an algebra based lab science. Course Length: Two semesters.

## AP Chemistry-1 Credit

## Prerequisite: Recommended " $B$ " or higher in Algebra 2 and completion of Chemistry/Chemistry Honors

Students solve chemical problems by using mathematical formulation principles and chemical calculations in addition to laboratory experiments. They build on their general understanding of chemical principles and engage in a more in-depth study of the nature and reactivity of matter. Students focus on the structure of atoms, molecules, and ions, and then go on to analyze the relationship between molecular structure and chemical and physical properties. To investigate this relationship, students examine the molecular composition of common substances and learn to transform them through
chemical reactions with increasingly predictable outcomes. Students prepare for the AP exam. The course content aligns to the sequence of topics recommended by the College Board. Course Length: Two semesters.

## AP Environmental Science- 1 Credit

Prerequisite: Current Sophomore
Students examine the natural world's interrelationships in AP Environmental Science. During this two-semester course, they identify and analyze environmental problems and their effects and evaluate the effectiveness of proposed solutions. They learn to think like environmental scientists as they make predictions based on observation, write hypotheses, design and complete field studies and experiments, and reach conclusions based on the analysis of resulting data. Students apply the concepts of environmental science to their everyday experiences, current events, and issues in science, politics, and society. The course provides opportunities for guided inquiry and student-centered learning that build critical thinking skills. Prerequisites for enrollment include two years of prior coursework in laboratory sciences (Biology, Chemistry, Earth Science, or Physics). Course Length: Two semesters.

## STEM Labs (Offered in Junior and Senior Year)

STEM Labs are thematic, interdisciplinary instructional blocks organized around career clusters and STEM college pathways. These courses combine rigorous academics and "real world" application of learning. Initial programs will focus on Science, Technology, Engineering and Math (STEM) career pathways to prepare students for postsecondary work in the STEM fields. The $11^{\text {th }}$ and $12^{\text {th }}$ Grade English class integrates and delves into a wide range of themes and research that supports the $11^{\text {th }}$ and $12^{\text {th }}$ grade STEM Labs.

## Introduction to Computers and Engineering Problem Solving

This course teaches fundamental software development and computational methods for engineering, scientific and managerial applications. Emphasis is focused on object-oriented software design and development. Assignments cover programming concepts, graphical user interfaces, numerical methods, data structures, sorting and searching, computer graphics and selected advanced topics. The Java programming language is used.

## Environmental Engineering and Sustainable Design (EESD) - 1 Credit

## Prerequisite: Current Junior

The cause, effect, and science of global climate change, along with a strong emphasis on engineering and sustainability solutions, are the central themes of this course. In EESD students will explore green jobs and solutions to a number of environmental issues through design, efficiency, and engineering projects. Topics covered include LEED certification, green construction, alternative energy, water and waste management, transportation system design, public land use, ecosystem services, and urban design and community planning. This class will include instruction in specific tech skills, such as GIS/GPS, drafting, energy auditing, 2D and 3D design, model building, landscape design, engineering testing, and environmental impact statements. Student groups will be encouraged to enter their projects in several national and state contests. In addition, several of the Grand Challenges for Engineering will be addressed, including:

- Make Solar Energy Economical
- Provide Energy from Fusion
- Develop Carbon Sequestration Methods
- Manage the Nitrogen Cycle
- Provide Access to Clean Water
- Engineer the Tools of Scientific Discovery

Course content will also examine the nature of the global climate system and the main processes controlling climate. Topics covered will include the global energy balance, atmospheric circulation, the role of oceans and ice in climate, the carbon cycle, atmospheric composition. Course Goals: learn about the climate system from modern instrumentation and theory; learn about Earth's past climates and the evolution of life, environment, and atmospheric composition as a context for understanding modern climate change; learn the science necessary to understand modern environmental problems, especially from increasing greenhouse gases and ozone depleting chemicals.

## Forensics \& Psychology- 2 Credits Total

Prerequisite: Current Junior
Forensic Science/Psychology is a junior level course that integrates English Language Arts 103, AP Psychology, and Forensic Science and offers multiple opportunities for students to engage in systems biology problem solving. In addition to the systems approach to learning, students will also tackle aspects of three of the Grand Challenges in Engineering. For Reverse Engineering the Brain, students will seek to understand how the brain works and apply that knowledge to computing and problem-solving. In order to Advance Health Informatics, students will build databases and construct GPS/GIS crime maps to help predict crime frequency in our geographical area and inform the public about their safety. The skills learned during these activities will benefit students in other fields such as public health and homeland security as well. Finally, with Engineering: the Tools for Scientific Discovery, students will grapple with new mathematical and computing methods that are incorporated in this new emerging discipline of Systems Biology.

## Forensic Science - 1 Credit

Forensic Science offers students multiple opportunities to engage in systems biology problem solving, apply forensic science knowledge to engineer crime maps and data bases, and provides students with innovative thinking and $21^{\text {st }}$ Century skills to be successful in STEM occupations. Students will study units in fingerprinting, trace evidence, toxicology, blood, anthropology and entomology, and crime scenes. When coupled with psychology, students may participate in potential job shadows or internships in a Crime Lab, in a Finger Printing Lab, and a Biology Lab. Course Length: One semester.

## AP Psychology - 1 Credit

AP PSYCHOLOGY This course is the equivalent of an introductory college-level course. Students receive an overview of current psychological research methods and theories. They explore the therapies used by professional counselors and clinical psychologists, and examine the reasons for normal human reactions: how people learn and think, the process of human development and human aggression, altruism, intimacy, and selfreflection. They study core psychological concepts, such as the brain and sensory functions, and learn to gauge human reactions, gather information, and form meaningful syntheses. Students prepare for the AP Exam and for further studies in psychology and life sciences.

## Course Length: One semester.

## Physics I-2 Credits Total

## Prerequisite:

This course introduces classical mechanics. Space and time: straight-line kinematics; motion in a plane; forces and static equilibrium; particle dynamics, with force and conservation of momentum; relative inertial frames and non-inertial force; work, potential energy and conservation of energy; kinetic theory and the ideal gas; rigid bodies and rotational dynamics; vibrational motion; conservation of angular momentum; central force motions; fluid mechanics. Subject taught using the TEAL (Technology-Enabled Active Learning) format which features students working in groups of three, discussing concepts, solving problems, and doing table-top experiments with the aid of computer data acquisition and analysis.

Elementary mechanics is presented in greater depth than in 8.01. Newton's laws, concepts of momentum, energy, angular momentum, rigid body motion, and non-inertial systems. Uses elementary calculus freely; concurrent registration in a math subject more advanced than 18.01 is recommended. In addition to covering the theoretical subject matter, students complete a small experimental project of their own design. Freshmen admitted via AP or Math Diagnostic for Physics Placement results.

## Physics II-2 Credits Total

Prerequisite: Current Senior \& successful completion of Physics I
The senior level Advanced Physics/Global Engineering Lab integrates AP Physics C Mechanics and Electromagnetism, Advanced Physics/Engineering Lab, and English Language Arts 12. This course is an in-depth investigation into the physical universe. It will include extensive mathematical modeling of physical phenomena and calculus based problem solving. Mind expanding theoretical material will be balanced with hands-on lab investigations and projects. This class is designed to prepare students for future science and engineering studies in college. It will lay the analytical foundation for STEM fields in general and for three specific Grand Challenges of Engineering; we will use the laws of classical physics to introduce the mechanical and electrical engineering basis to Maintain and Improve Urban Infrastructure, the fundamentals of circuits and electronics to model and Reverse Engineer the Brain, and finally students will use their developing ability in both theory and practice to Engineer the Tools of Scientific Discovery.

Projects will form the bridge to allow students to creatively integrate their physics/engineering knowledge, lab skills and language arts studies.

## Advanced Physics C: Mechanics and Electromagnetism - 1 Credit (AP)

The first semester will have an emphasis on classical mechanics: motion, forces, momentum, energy, and universal gravity. Special attention will be placed on rotational physics. The second semester will focus on Maxwell's Equations of Electromagnetism. The development of advanced mathematical problem solving ability (including calculus) will be the key goal of this course. Students will be prepared to take the AP Physics C exam in May with the possibility of earning college credit. This course will prepare students for university level physical science and engineering studies.

## Global Engineering Lab-1 Credit

Students will make extensive use of hardware to investigate phenomena, apply physical/mathematical understanding and create new devices. Fundamental investigations include measuring the speed of light, determining the constant of universal gravitation and measuring the charge to mass ratio for the electron. Electric and magnetic interactions will be examined in detail. Application/verification labs will look closely at torque, angular momentum and the fundamental conservation laws. Lastly, students will create and build new devices that utilize their expanding physics background. The course will include projects that will allow students to creatively integrate their physics and engineering knowledge, lab skills and English Language Arts 12. One project will be to design and build a scale model space station with appropriate artificial gravity and power management.

## Biotechnology I-1 Credit

This course is designed to introduce students to the scientific concepts and laboratory research techniques currently used in the field of Biotechnology. Students will develop laboratory skills, critical thinking, and communication skills currently used in the industry. After completing this course, students will have the necessary skills to transition to an entry-level biotech position. Biotechnology 1 areas of study include: DNA \& Protein structures, function and analysis, bioethics and careers in biotechnology.

## Biotechnology II - 1 Credit

A continuation of Biotechnology I, students will be introduced to the scientific concepts and advanced laboratory research techniques currently used in the field of biotechnology. Areas of study include plant biotechnology, synthesizing DNA and PCR, pharmaceutical biotechnology and DNA sequencing and Genomics.

## Biomedical Engineering - 2 Credits Total

## Prerequisite: Current Senior

The STEM Lab Concentration in Biomedical Engineering is a course for seniors that integrates Human Anatomy and Physiology, Biomed, and English Language Arts and offers opportunities for students to engage in systems biology problem solving. This course will address two of the Grand Challenges of Engineering, including Advancing Health Informatics and Engineering Better Medicines. In Advancing Health Informatics, students will use the knowledge gained in Human Anatomy and Physiology and Biology to research and communicate medical information to improve the quality and efficiency of healthcare. In Engineering Better Medicines, students will work to improve systems needed to offer safe and effective drugs to healthcare patients. As a part of independent and group research in this stem lab concentration, students will be encouraged to enter projects in state and national competitions.

## Human Anatomy and Physiology-1 Credit

This course is an in-depth study of human anatomy and physiology, focusing on the eleven human body systems: integumentary/tissues, skeletal, muscular, digestive, urinary, cardiovascular, respiratory, nervous, reproductive, endocrine, and lymphatic. Primary study within this course includes terminology associated with the human body and the relationships between the structure and function of organ systems. Lab exercises in this course include dissections and physiological tests with Vernier probeware. This course will be taken in conjunction with the Biomedical Engineering course program to provide students with the knowledge needed to design and develop medical advances.

## Biomedical Engineering -1 Credit

This course is an extension of the Human Anatomy and Physiology Pre-Advanced Placement course (Students must be taking Human Anatomy and Physiology Pre-AP concurrently.) In this course, students will critically evaluate current medical practices, engage in communication concerning ethics associated with health, and research and develop improvements in medical technology. This course will focus on the areas of Cellular and Tissue Engineering, Musculo-Skeletal: Biomechanics, Infectious Disease, Cardiovascular and Respiratory Physiology, Digestive Health, and Bio imaging. Biomedical Engineering will incorporate partnerships with local organizations and businesses and will require students to work collaboratively with each other and these partners.

## Online Courses

JOURNALISM (ELECTIVE) / Students are introduced to the historical importance of journalism in America. They study the basic principles of print and online journalism as they examine the role of printed news media in our society. They learn investigative skills, responsible reporting, and journalistic writing techniques as they read, respond to, and write their own news and feature articles. Students conduct interviews, research, write, and design their own publication. Course Length: One semester

PUBLIC SPEAKING (ELECTIVE) / Students are introduced to public speaking as an important component of their academic, work, and social lives. They study public speaking occasions and develop skills as fair and critical listeners, or consumers, of spoken information and persuasion. Students study types of speeches (informative, persuasive, dramatic, and special occasion), read and listen to models of speeches, and prepare and present their own speeches to diverse audiences. Students learn to choose speaking topics and adapt them for specific audiences, to research and support their ideas, and to benefit from listener feedback. They study how to incorporate well-designed visual and multimedia aids in presentations and how to maintain a credible presence in the digital world. Students also learn about the ethics of public speaking and about techniques for managing communication anxiety. Course Length: One Semester.

CREATIVE WRITING (ELECTIVE) / Students create original essays, poems, and short stories in this course, which uses two textbooks and focuses on the four-step process writing model. They read professionally written forms of creative writing as models and then integrate their impressions of these works with their personal life experiences as they compose their own writing projects. Students are encouraged to write about topics they find engaging as they practice writing on the following themes: narration, definition, process analysis, cause and effect, and comparison/contrast. After students turn in each assignment, the teacher supplies detailed suggestions for revision. This feedback helps students learn how to improve their self-expression and self-editing skills. Course Length: Two semesters.

ACCOUNTING (ELECTIVE) / Through this course, students gain a foundation in the skills needed for college accounting courses, office work, and managing their own small businesses. This introduction to accounting gives students who have never had prior accounting training an overview of the three forms of accounting: financial, cost, and management accounting. The course helps build an appreciation for the role of accounting in managing a profitable business. Instructional material covers the basic concepts, conventions, and rules of the double entry system and includes techniques for analyzing ratios from a balance sheet. The concept of ethics, integrity, confidentiality, and rigor are woven through all the units. Course Length: Two semesters.

Pre-Advanced Placement EARTH SCIENCE / This challenging course provides students with an honors level earth science curriculum, focusing on geology, oceanography, astronomy, weather, and climate. The program consists of online lessons, an associated reference book, collaborative activities, and hands-on laboratories students can conduct at home. The course prepares students for advanced studies in geology, meteorology, oceanography, and astronomy courses, and gives them more sophisticated experience in implementing scientific methods. Additional honors assignments include debates, research papers, extended collaborative laboratories, and virtual laboratories. Course Length: Two semesters.

ARCHAEOLOGY /George Santayana once said, "Those who cannot remember the past are condemned to repeat it." The field of archaeology helps us better understand the events and societies of the past that have helped shape our modern world. This course focuses on the techniques, methods, and theories that guide the study of the past. Students learn how archaeological research is conducted and interpreted, as well as how artifacts are located and preserved. Finally, students learn about the relationship of material items to culture and what we can learn about past societies from these items. Course Length: One Semester.

ASTRONOMY / Why do stars twinkle? Is it possible to fall into a black hole? Will the sun ever stop shining? Since the first glimpse of the night sky, humans have been fascinated with the stars, planets, and universe. This course introduces
students to the study of astronomy, including its history and development, basic scientific laws of motion and gravity, the concepts of modern astronomy, and the methods used by astronomers to learn more about the universe. Additional topics include the solar system, the Milky Way and other galaxies, and the sun and stars. Using online tools, students examine the life cycle of stars, the properties of planets, and the exploration of space. Course Length: One Semester.

VETERINARY SCIENCE / As animals play an increasingly important role in our lives, scientists have sought to learn more about their health and well-being. Taking a look at the pets that live in our homes, on our farms, and in zoos and wildlife sanctuaries, this course examines some of the common diseases and treatments for domestic animals. Toxins, parasites, and infectious diseases affect not only the animals around us, but at times, us humans as well! Through veterinary medicine and science, the prevention and treatment of diseases and health issues are studied and applied. Course Length: One Semester.

INTRODUCTION TO AGRISCIENCE / In this course, students learn about the development and maintenance of agriculture, animal systems, natural resources, and other food sources. Students also examine the relationship between agriculture and natural resources and the environment, health, politics, and world trade. Course Length: One Semester.

AP ART HISTORY (ELECTIVE) / This course is designed to broaden students' knowledge of architecture, sculpture, painting, and other art forms within various historical and cultural contexts. In AP Art History, students identify and classify artworks from prehistory through the 20th century, formally analyze artworks by placing them in the historical context within which they were created, consider the visual traditions of the cultures that created artworks, and understand interdisciplinary and cultural influences on works of art. In addition to visual analysis, the course considers issues such as patronage, gender, and the functions and effects of artworks. This course uses a textbook. Prior art training is not necessary for enrollment. Course Length: Two semesters.

MUSIC APPRECIATION (ELECTIVE) / This course introduces students to the history, theory, and genres of music. The course explores the history of music, from the surviving examples of rudimentary musical forms through to contemporary pieces from around the world. The first semester covers early musical forms, classical music, and American jazz. The second semester presents modern traditions, including gospel, folk, soul, blues, Latin rhythms, rock and roll, and hip hop. The course explores the relationship between music and social movements and reveals how the emergent global society and the prominence of the Internet are making musical forms more accessible worldwide. To comply with certain state standards for the arts, a student "performance practicum" is required for full credit each semester. The performance practicum requirement can be met through participation in supervised instrumental or vocal lessons, church or community choirs, community musical performances, or any other structured program that meets at regular intervals and provides opportunities for students to build vocal and/or instrumental skills. Parents or guardians will be required to present their proposed practicum to the students' teachers for approval, and validate their children's regular participation in the chosen performance practicum. Course Length: Two semesters.

PERSONAL FINANCE (ELECTIVE) / In this introductory finance course, students learn basic principles of economics and best practices for managing their own finances. Students learn core skills in creating budgets, developing long-term financial plans to meet their goals, and making responsible choices about income and expenses. They gain a deeper understanding of capitalism and other systems so they can better understand their role in the economy of society. Students are inspired by experiences of finance professionals and stories of everyday people and the choices they make to manage their money. Course Length: One semester.

INTRODUCTION TO ENTREPRENEURSHIP I (ELECTIVE) / In this introductory business course, students learn the basics of planning and launching their own successful business. Whether they want to start their own money-making business or create a non-profit to help others, this course helps students develop the core skills they need to be successful. They learn how to come up with new business ideas, attract investors, market their business, and manage expenses. Students
hear inspirational stories of teen entrepreneurs who have turned their ideas into reality, and then they plan and execute their own business. Course Length: One semester.

INTRODUCTION TO ENTREPRENEURSHIP II (ELECTIVE) / Students build on the business concepts they learned in Introduction to Entrepreneurship I. They learn about sales methods, financing and credit, accounting, pricing, and government regulations. They refine their technology and communication skills in speaking, writing, networking, negotiating, and listening. They enhance their employability skills by preparing job-related documents, developing interviewing skills, and learning about hiring, firing, and managing employees. Students develop a complete business plan and a presentation for potential investors. Course Length: One semester.

INTRODUCTION TO MARKETING I (ELECTIVE)/ Students find out what it takes to market a product or service in today's fast-paced business environment. They learn the fundamentals of marketing using real-world business examples. They learn about buyer behavior, marketing research principles, demand analysis, distribution, financing, pricing, and product management. Course Length: One semester.

INTRODUCTION TO MARKETING II (ELECTIVE)/ Students build on the skills and concepts learned in Introduction to Marketing I to develop a basic understanding of marketing principles and techniques. By the end of the course, they will have developed their own comprehensive marketing plan for a new business. Course Length: One semester.

INTERNATIONAL BUSINESS (ELECTIVE) / From geography to culture Global Business is an exciting topic in the business community today. This course is designed to help students develop the appreciation, knowledge, skills, and abilities needed to live and work in a global marketplace. It takes a global view on business, investigating why and how companies go international and are more interconnected. The course further provides students a conceptual tool by which to understand how economic, social, cultural, political and legal factors influence both domestic and cross-border business. Business structures, global entrepreneurship, business management, marketing, and the challenges of managing international organizations will all be explored in this course. Students will cultivate a mindfulness of how history, geography, language, cultural studies, research skills, and continuing education are important in both business activities and the 21st century. Course Length: One semester.

SPORTS AND ENTERTAINMENT MARKETING (ELECTIVE) / Have you ever wished to play sports professionally? Have you dreamed of one day becoming an agent for a celebrity entertainer? If you answered yes to either question, then believe it or not, you've been fantasizing about entering the exciting world of sports and entertainment marketing. Although this particular form of marketing bears some resemblance to traditional marketing, there are many differences as wellincluding a lot more glitz and glamour! In this course, you'll have the opportunity to explore basic marketing principles and delve deeper into the multi-billion dollar sports and entertainment marketing industry. You'll learn about how professional athletes, sports teams, and well known entertainers are marketed as commodities and how some of them become billionaires as a result. If you've ever wondered about how things work behind the scenes of a major sporting event such as the Super Bowl or even entertained the idea of playing a role in such an event, then this course will introduce you to the fundamentals of such a career. Course Length: One semester.

SKILLS FOR HEALTH (ELECTIVE) / This course focuses on important skills and knowledge in nutrition; physical activity; the dangers of substance use and abuse; sex education; injury prevention and safety; growth and development; and personal health, environmental conservation, and community health resources. The curriculum is designed around topics and situations that engage student discussion and motivate students to analyze internal and external influences on their health-related decisions. The course helps students build the skills they need to protect, enhance, and promote their own health and the health of others. Course Length: One semester.

HEALTH SCIENCES (ELECTIVE)/ Will we ever find a cure for cancer? What treatments are best for conditions like diabetes and asthma? How are illnesses like meningitis, tuberculosis, and the measles identified and diagnosed? Health sciences provide the answers to questions such as these. In this course, students will be introduced to the various disciplines
within the health sciences, including toxicology, clinical medicine, and biotechnology. They will explore the importance of diagnostics and research in the identification and treatment of diseases. The course presents information and terminology for the health sciences and examines the contributions of different health science areas.

## Course Length: One semester.

PHYSICAL EDUCATION (ELECTIVE) / This course combines online instructional guidance with student participation in weekly cardiovascular, aerobic, muscle-toning, and other activities. Students fulfill course requirements by keeping weekly logs of their physical activity. The course promotes the value of lifetime physical activity and includes instruction in injury prevention, nutrition and diet, and stress management. Students may enroll in the course for either one or two semesters, and repeat for further semesters as needed to fulfill state requirements. Students will earn a standard letter grade for completing this course. Course Length: One semester.

PHYSICAL EDUCATION B (ELECTIVE) /This high school course focuses on the fundamental components and principles of fitness. Physical Education examines safety guidelines, proper technique, and exercise principles such as FITT: Frequency (how often you exercise), Intensity (how hard you work during exercise), Time (how long you exercise), and Type (what type of activity you do). Students assess their current level of fitness in relation to the five components of physical fitness: flexibility, cardiovascular health, muscular strength, muscular endurance, and body composition. This course equips students with strategies to help them begin, design, and maintain an exercise program to keep them fit for life. Course Length: One semester.

ACHIEVING YOUR CAREER AND COLLEGE GOALS (ELECTIVE)/ Students explore their options for life after high school and implement plans to achieve their goals. They identify their aptitudes, skills, and preferences and explore a wide range of potential careers. Students investigate the training and education required for the career of their choice and create a plan to be sure that their work in high school is preparing them for the next step. They also receive practical experience in essential skills such as searching and applying for college, securing financial aid, writing a resume and cover letter, and interviewing for a job. This course is geared toward 11th and 12th graders. Course Length: One semester.

DRIVERS SAFETY (ELECTIVE) / Drivers Safety can provide a foundation for a lifetime of responsible driving. Instructional material in this course emphasizes the mechanics of driving operations and the rules of safe driving. Among other topics, students learn how to assess and manage risk, handle social pressures, understand signs and signals, comprehend the rules of the road, and start, steer, stop, turn, and park a car. They also learn how to contend with driving environments including light and weather conditions, share the roadway, respond to an emergency, buy and maintain a car, plan a trip, take a state driving test, and partner with their parents or guardians to promote safety on the road. Students use a textbook for this one-semester course. This course may not satisfy the state department of transportation's or motor vehicle's requirements for learners permit issuance. Please consult local requirements prior to enrolling.

## Course Length: One semester.

NUTRITION AND WELLNESS (ELECTIVE)/ This one-semester elective course provides students with an overview of good nutrition principles that are necessary for physical and mental wellness and a long, healthy life. Instructional materials include discussions of digestion, basic nutrients, weight management, sports and fitness, and lifespan nutrition. The Nutrition and Wellness course emphasizes an understanding of today's food and eating trends and gives students the capacity to intelligently evaluate all available sources of nutrition information and make informed decisions. Unit topics include a course introduction, wellness and food choices in today's world, digestion and major nutrients, and body size and weight management. Course Length: One semester.

LAW AND ORDER (ELECTIVE) /Every society has laws that its citizens must follow. From traffic laws to regulations on how the government operates, laws help provide society with order and structure. Our lives are guided and regulated by
our society's legal expectations. Consumer laws help protect us from faulty goods; criminal laws help to protect society from individuals who harm others; and family law handles the arrangements and issues that arise in areas like divorce and child custody. This course focuses on the creation and application of laws in various areas of American society. By understanding the workings of our court system, as well as how laws are actually carried out, we become more informed and responsible citizens in our communities and of our nation.

## Course Length: One semester.

INTRODUCTION TO CULINARY ARTS (ELECTIVE) / Food is all around us-we are dependent on it and we enjoy it. This course will give you the basic fundamentals to start working in the kitchen and gaining experience as you explore and establish your talents for cooking and preparing food in a creative and safe way. You will learn safety measures as well as enhance your knowledge of various types of foods and spices. If you enjoy hands-on learning and want to deepen your knowledge about culinary arts, this is a great course to start. Course Length: One semester.

SERVICE LEARNING (ELECTIVE) / This project may be used in a variety of ways-as a stand-alone project, in conjunction with another course, or as a foundation around which to base a one-semester course. An introductory unit presents instruction on the nature of service learning. Students are taught how to identify community needs, select projects that are meaningful to themselves, apply practical skills, reflect on their learning experience, and behave responsibly in a service setting. Students then move on to design and conduct service learning experiences of their own, according to the requirements of their projects. Documents to support teachers in guiding students through the project are included.

## Course Length: One semester.

## Game Design 101-1 Credit

Game Design Lab will focus on designing eight simple playable games, each exploring different aspects of game design such as rule design, game balance, multiplayer strategy, complexity, randomness, narrative, psychology, emergent behavior rand aspects of physical game bit and interface design. The first part will cover game design concepts through readings, presentations, play testing, and non-digital game design assignments and some hands-on lab projects that teach the elements of game development. The second semester will shift towards an iterative-lab based production of simple electromechanical games that use a microcontroller as their "brain." Course Length: One Semester.

## Graphic Art 101-1 Credit

Prerequisite: Current Freshman
2-D Art is a studio introductory course to develop visual communication skills in the area of two-dimensional drawing, painting, and mixed media. These techniques focus on a sequence; beginning with observing and drawing from life to computer-based imaging. Students will expand their ability to see visually, develop unique and personal ideas, and to think creatively.

Fundamental drawing concepts, creative problem solving techniques, and basic design principles will be covered. Materials explored in this course will be useful to any area of study where visual enhancement may apply to mathematical, engineering and scientific illustration, drawing from life, cartooning curriculum for the entire school year. Sketchbook and journal work will be a daily activity.

During the course of the year, students will: Develop an understanding of the visual arts through studio production techniques and processes; Develop an understanding of both the historical inquiry and vocabulary of the art process and apply new knowledge to solving unique design problems; Have a rich and varied exposure to a broad range of experiences utilizing the concepts and techniques of the visual arts as a vehicle for the expression of ideas; Make connections within the visual arts through the critical interpretation and evaluation of works of art and across disciplines with a focus on improving our world and the human experience. Course Length: One semester.

3D ART I - MODELING (ELECTIVE) /This course introduces students to 3D modeling tools and concepts. Using Blender, the popular open-source 3D modeling package, students learn the basics of creating shapes, adding textures and lighting, and rendering. By the end of the course, students produce a series of increasingly sophisticated projects for their 3D portfolio. This course is suitable for students with no prior experience in 3D game design or digital media authoring tools. Course Length: One semester.

3D ART II - ANIMATION (ELECTIVE)/ In this advanced course, students build on the skills they developed in 3D Art I to learn 3D animation techniques. Using Blender, a powerful open-source modeling tool, students master the basics of animation-rigging, bones, and movement-while learning how to apply traditional animation techniques to their 3D models. Course Length: One semester.

AUDIO ENGINEERING (ELECTIVE)/ In this introductory course, students learn about the physics of sound and the history of recording technologies. They learn about the four stages of professional music recording projects: recording, editing, mixing, and mastering. Using Audacity, an open-source recording and mixing program, they practice the techniques used by sound engineers to produce multi-track recordings. Through a series of engaging hands-on projects, they learn the fundamental concepts of audio engineering. Course Length: One semester.

DIGITAL ARTS I (ELECTIVE)/ In this exploratory course, students learn the elements and principles of design, as well as foundational concepts of visual communication. While surveying a variety of media and art, students use image editing, animation, and digital drawing to put into practice the art principles they've learned. They explore career opportunities in the design, production, display, and presentation of digital artwork. They respond to the artwork of others, and learn how to combine artistic elements to create finished pieces that effectively communicate their ideas.
Course Length: One semester.
DIGITAL ARTS II (ELECTIVE) /Students build on the skills and concepts they learned in Digital Arts I as they develop their vocabulary of digital design elements. By the end of the course, they will have created a collection of digital art projects for their digital design portfolio. Course Length: One semester.

IMAGE DESIGN AND EDITING (ELECTIVE) /This introductory design course is for students who want to create compelling, professional-looking graphic designs and photos. Students learn the basics of composition, color, and layout through the use of hands-on projects that allow them to use their creativity while developing important foundational skills. They use GIMP software to create a graphic design portfolio with a wide variety of projects involving the mastery of technical topics, such as working with layers and masks, adding special effects, and effectively using typefaces to create visual impact. The projects help students develop the skills they need to create and edit images of their own. Course Length: One Semester.

DIGITAL PHOTOGRAPHY I (ELECTIVE) / Have you ever wondered how photographers take such great pictures? Have you tried to take photographs and wondered why they didn't seem to capture that moment that you saw with your eyes? The Digital Photography I course focuses on the basics of photography, including building an understanding of aperture, shutter speed, lighting, and composition. Students will be introduced to the history of photography and basic camera functions. Students will use the basic techniques of composition and camera functions to build a portfolio of images, capturing people, landscapes, close-up, and action photographs. Course Length: One semester.

DIGITAL PHOTOGRAPHY II (ELECTIVE) / In today's world, photographs are all around us, including in advertisements, on websites, and hung on our walls as art. Many of the images that we see have been created by professional photographers. In this course, we will examine various aspects of professional photography, including the ethics of the profession, and examine some of the areas that professional photographers may choose to specialize in, such as wedding photography and product photography. We will also learn more about some of the most respected professional photographers in history and we will learn how to critique photographs in order to better understand what creates an eye catching photograph. Course Length: One semester.

