

Pittsburgh Science and Technology Academy

**Course Offerings
2018-2019**

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Art & Music

AP Studio Art 2D

Level: 11th, 12th
Length: Semester
Credit: 1

The AP Studio Art course is for students interested in a rigorous and focused study in two-dimensional art. Students will develop a quality portfolio that demonstrates a mastery of concept, composition and execution in 2-D Design. This course is based on a student creating a body of work that demonstrates quality, concentration and breadth— artistic skills and ideas they have developed, refined, and applied over the course of the semester to produce visual compositions. This portfolio will be submitted to the College Board for college credit. As in any college level course students will be expected to spend a considerable amount of time outside of class in order to complete assignments and doing homework and sketchbook assignments.

Art Technology Specialized Accelerated Grad

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

In this course, students are introduced to Visual Communication through exploration of how humans effect and create the visual culture. The art that the students create will be used to acquire a working knowledge of the Adobe Creative Suite; the industry standard design software. Students will use the tools and techniques of the digital art room to delve into ideas of express through themes of: Inspiration, Reflection, Creation of Voice, and Communication.

Art Through Science

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

In this course, students will be introduced to photography and digital video as well as the science and technology of digital cameras. The art the students create will be used to acquire a working knowledge of Adobe Photoshop and Premiere; the industry standard photo and video editing programs. Students will use artistic tools and personal experiences to delve into different creative genres, including abstract photography, portraiture, photo essays, as well as create short movies and documentaries.

Music Composition and Arranging

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

The music composition and arranging class will study composition, arranging, scoring, and production techniques and approaches. The student will apply those skills and concepts by writing for and overseeing the production of a wide variety of instrumental, vocal, acoustic, or electronic combinations. The student will explore contemporary concepts and techniques of arranging and sound production in both the analog and digital domains and will gain valuable experience by being able to create, arrange, and produce projects. Interpersonal and other situational skills will be developed as the student works with the instructor, and other students, in a variety of creative settings as music writer, and/or producer. Students will learn to use both traditional and non-traditional music notation in their projects. We use Logic ProX for instruction.

Music Production and Engineering

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

This course is designed to develop an appreciation of music through listening, analyzing, evaluating, and composing skills. The curriculum in Music Production and Engineering encourages students to develop an understanding of music elements, including rhythm, melody, harmony, form, and tone color, while fully engaging students in hands-on activities. Students then showcase their knowledge and skills learned through original, creative projects. Music technology in our Mac Lab is an integral part of the course. We use Logic ProX for instruction.

Business Technology

Career Tech

Level: 9th

Length: Quarter

Credit: .5

This course will focus on the use of software (MS Office) and career and college preparation. Students will also be introduced to the content of each SciTech STEM concentration.

Science of Economics and Personal Finance

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

This class is a crash course in economics. Fundamentals from both AP Micro and AP Macroeconomics will be explored in the beginning of the class. Not only will students learn concepts but they will also be able to put them in to practice with this class. Topics include: Basic Economics, Microeconomics, Macroeconomics, economic models, supply and demand, taxes, trade, international trade, personal finance, investing, and the stock market. All of these topics will be looked at through the backdrop of our current presidents domestic policy and economic plan for the United States.

English/ Literature

AP English 3- Language and Composition

Level: 10th

Length: Semester

Credit: 1

This course is offered as an alternative to English 3 at Sci Tech. The course is directly aligned with the College Board's internationally-recognized Advanced Placement English Language and Composition course which focuses on non-fiction text, argumentation, Aristotelian writing theory, rhetoric and the synthesis of multiple primary sources in thinking, reading and writing. AP English 3 is open to all students who are interested in pushing their boundaries and working vigorously to achieve English coursework and learning at a college level. The course is designed to provide students with the experience of a college-level Rhetoric course, so students who successfully complete this course and the accompanying College Board AP Exam may be eligible for college credit.

AP English 4- Literature and Composition

Level: 11th, 12th

Length: Semester

Credit: 1

As an alternative to English 4, this course is offered to students interested in an intense study of literature and composition at a college-level of rigor, pacing and complexity. Students will study British and American poetry, novels, drama and short fiction in an effort to broaden their understandings of philosophy, psychology, anthropology, mythology, history and culture through the perspectives of multiple authors. Aligned with the College Board's internationally-recognized Advanced Placement English Literature and Composition course, AP English 4 affords students the opportunity to learn at an accelerated level and potentially earn college credit for their work.

Creative Writing 1

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

In this one quarter elective course, the student with a particular interest in writing will have the opportunity to become a poet, a creative non-fiction writer, zine maker, and a fiction writer. Writing and sharing writing with others helps the student both to appreciate and to produce imaginative prose and poetry. An ultimate goal of this course is to challenge students to publish their writing. This is an elective course.

English 1

Level: 9th

Length: Semester

Credit: 1

This is a required, 1st-semester course for all 9th grade students at Sci Tech. Students explore the overarching theme of Identity in a focused study of novels, drama, poetry and non-fiction texts. Students are expected to read and write with fluency using MLA formatting for all formally written work. This is the foundational English course designed to provide all students with an understanding of note-taking, reading and writing, research competency, and critical thinking.

English 2

Level: 9th

Length: Semester

Credit: 1

During this course, students are invited to explore how language and literature simultaneously emerge as products and producers of society. In the process, students begin building on the solid foundation of critical thinking, research skills, and writing proficiency established in earlier years to analyze literature on a more sophisticated level. Intensive focus on the major literary genres demonstrates to students how structures of communication contribute to meaning. While deciphering and interpreting how other writers have manipulated structure, text, and images to create meaning, students acquire the insight and techniques needed to communicate effectively themselves. To that end, the intensified study of rhetorical and literary conventions parallels instructional emphasis on developing organization and focus in the students' own writing assignments. Major works studied include A Lesson Before Dying, Night, and Julius Caesar.

English 3

Level: 10th

Length: Semester

Credit: 1

The theme for this course is "Voices of the American Experience" in which students are engaged in reading, discussing, writing, and speaking opportunities about how the events from American history impact American literature. Investigation and inquiry through powerful essential questions guide the teaching and learning that occur in this accelerated course. The Language of Literature anthology will be used for many of the reading selections, however, students will also read several novels over the course of the semester that focus on the genres of drama, historical fiction, and nonfiction. This curriculum is enhanced with specific project-based and technology-based assignments.

English 4

Level: 11th, 12th

Length: Semester

Credit: 1

Over the course of the year, students will read and analyze various works of fiction, nonfiction, and drama. All readings will be analyzed and evaluated in a literary and historical context so that the student

will gain an understanding of the historical, cultural, and philosophical influences that shape literary art. During this semester, students will ultimately aim to master major writing modes (narration, exposition, and argumentation) in order to address their specific writing objectives and target audiences. Additionally, they will gain practice in creative, technical, and research writing through culminating response to literature pieces. Major works studied include Macbeth, Fences, The Kite Runner, and Their Eyes Were Watching God.

Film as Literature

Level: 11th, 12th

Length: Quarter

Credit: .5

Film as Literature (SCITECH ONLY) is an intensive quarter course designed for students interested in considering how film techniques are used to tell a story and how it differs from those used in literature. Students will consider how filmmakers purposely create a desired effect to develop theme, characterization, mood and plot. Students will view a selection of films, become familiar with film elements (shots, angles, lighting, sound, etc.) and how they are used to influence the audience's perception and understanding.

Graduation Project

Executive Experience

Level: 12th

Length: Quarter-Year

Credit: 2

The goal of the Executive Experience is to give students the real-world skills necessary to succeed in a postsecondary professional or academic environment. Students will be grouped into interdisciplinary project teams, and design and implement a project for a client over the course of the year. Projects may include research and design components and will list specific deliverables and outcomes, which students must meet. Students will be responsible for project design and implementation, client communication, and final deliverables, including analysis, presentation and reporting.

Health and Physical Education

Health

Level: 9th

Length: Quarter

Credit: .5

Produces health literate citizens through a curriculum that addresses physical, mental, emotional, and social dimension of health. The curriculum provides students with an in-depth study of: comprehensive sexuality education, first aid, mental health, diseases, body systems and nutrition.

Personal Fitness

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

Personal Fitness is an elective for those who are interested in enhancing their fitness level. Personal Fitness is a sequentially planned, developmentally appropriate curriculum and instruction that promotes a health and active lifestyle. It helps students develop the knowledge, motor skills, self-management skills, social skills, attitudes and confidence needed to adopt and maintain physical activity throughout their lives.

Quality personal fitness programs provide opportunities for:

- Students to learn the five component of personal fitness
- Introductory to the weight room
- Skills necessary to perform a variety of physical activities
- Implications and benefits of participating regularly in physical activity
- All students to be physically active

Mathematics

Advanced Algebra & Probability Statistics

Length: Semester

Credit: 1

This is a course for any student who has successfully completed Algebra 1, Geometry, and Algebra II. This course emphasizes data analysis topics such as: analyzing and interpreting data, calculating probability, and making inferences. This course will prepare students for AP Statistics or Elementary Functions; it is not a Calculus-readiness course.

Algebra 1

Length: Semester

Credit: 1

The course develops and uses students' understanding of number and operation to build algebraic understanding. It is designed to follow the Middle School math sequence. This course explicitly develops students' mathematical habits of mind in conjunction with algebraic content and skills. The topics studied include Equations & Expressions, Data Analysis & Probability, Graphs, Linear Functions, Non-Linear Functions, Inequalities and Systems of Equations. Students will receive a 1 math credit and 1 elective credit for the year.

Algebra 2

Length: Semester

Credit: 1

In this Algebra course, students build on and deepen their understanding of Algebra 1, learning mathematical habits of mind and skills in the context of more advanced topics. These topics include quadratic functions, exponential functions, complex numbers, polynomial functions and logarithms. Students also deepen their study of data analysis and probability.

AP Calculus

Length: Year Long

Credit: 1 Math, 1 Elective

This year-long block math course is the standard first year AP Calculus program focused primarily on an intuitive understanding of the concepts of calculus. Students will experience the methods and applications of limits, differentiation and integration. It is intended for students who wish to pursue their study of higher level mathematics or try for advanced placement credit when they enter college. Students are prepared for and expected to take the Calculus AB Advanced Placement exam in the spring. The course carries one mathematics credit towards graduation requirements and one elective credit for the year.

AP Statistics

Length: Semester

Credit: 1

This rigorous course is designed for students who have successfully completed Algebra 1, Algebra 2, and Geometry, and if possible Elementary Functions or Probability and Statistics. This course emphasizes technology, analyzing and interpreting data, calculating probability, and making inferences. In addition to learning how statistics is used and found in the world around you, there is an emphasis on communicating clearly and concisely. Many colleges and universities offer Advanced Placement and/or college credit to students who perform successfully on the AP Statistics Exam and students are encouraged to take the exam.

Biostatistics

Level: 10, 11, 12

Length: Quarter

Credit: .5

Students will perform experiments and analyze data culturing bacteria from around SciTech's campus. Students will also analyze a LD50 bioassay for a toxic substance and will conduct research and data-analysis for a self-directed experiment or biological or medical data set. There are no mathematical prerequisites as the statistics the students encounter will be based on their prior knowledge. Students who haven't take a statistics course will learn descriptive statistics (mean, median, standard deviation, etc.) as well as ways of displaying data (histograms, box plots, scatter plots, etc.). Students who have taken AP Stat or Prob/Stat will use more sophisticated methods for exploring their data (hypothesis testing and confidence intervals).

Enhanced Algebra 2

Length: Year

Credit: 1 Math, 1 Elective

This Algebra course is the same as Algebra 2 (Semester) but it allows more time for enrichment activities and individualized support. Enrichment will take place in the context of individualized standards-based assignments and rigorous Pre-AP and technology-based projects.

Elementary Functions

Length: Semester

Credit: 1

This course is designed for students who have successfully completed Algebra 2 and want to prepare for College Level Mathematics. Graphing calculators are used extensively to investigate functions and their behavior. Topics include polynomial, rational, exponential, logarithms, and trigonometric functions. Additional topics are covered. Emphasis is on using concepts and skills to model situations and solve application problems. Elementary Functions is recommended for students who meet the proficiency

criteria as detailed in the Math Decision Trees.

Enhanced Algebra 1

Length: Year

Credit: 1 Math, 1 Elective

The course develops and uses students' understanding of number and operation to build algebraic understanding. This course explicitly develops students' mathematical habits of mind in conjunction with algebraic content and skills. The topics studied include Equations & Expressions, Data Analysis & Probability, Graphs, Linear Functions, Non-Linear Functions, Inequalities and Systems of Equations. Students will receive a 1 math credit and 1 elective credit for the year. This course has more time for enhancements such as focused activities and support on concepts of Algebra 1. Enrichment will take place in the context of individualized standards-based assignments as well as rigorous technology-based projects.

Enhanced Algebra 2

Length: Year

Credit: 1 Math, 1 Elective

This Algebra course is the same as Algebra 2 (Semester) but it allows more time for enrichment activities and individualized support. Enrichment will take place in the context of individualized standards-based assignments and rigorous Pre-AP and technology-based projects.

Enhanced Geometry

Length: Year

Credit: 1 Math, 1 Elective

This course is the same as semester Geometry. However, this course has more time for enhancements such as focused activities and support on concepts of Geometry. Enrichment will take place in the context of individualized standards-based assignments and projects, which will allow students to receive extra support when needed. Students will solve real-life Geometry problems that make connections to higher-level mathematics.

Geometry

Length: Semester

Credit: 1

This course is designed to provide a deep investigation of geometry. It is a student centered course incorporating logic and Euclidean geometry while emphasizing student problem solving through the development of Geometry Habits of Mind, which are critical for advanced mathematics courses. Using Habits of Mind, this course investigates the big ideas and skills of Geometry, including mathematical reasoning and proof, plane and solid Geometry topics (including area and volume), similarity and congruence.

Matrix and Linear Algebra

Length: Semester

Credit: 1

This course teaches higher level problem solving skills and techniques using special systems of algebraic notations involving matrices and determinants. It includes college level preparation in principles of systems of equations in n-dimensional space and incorporates applications in diverse fields of mathematics and science. Graphic utilities are used extensively.

Quantitative Ecology

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

Students will analyze data from SciTech's campus and Schenley Park for biodiversity, species distributions, and habitat diversity. Students will also conduct research and data-analysis for a self-directed experiment or ecological data set. There are no mathematical prerequisites as the statistics the students encounter will be based on their prior knowledge. Students who haven't take a statistics course will learn descriptive statistics (mean, median, standard deviation, etc.) as well as ways of displaying data (histograms, box plots, scatter plots, etc.). Students who have taken AP Stat or Prob/Stat will use more sophisticated methods for exploring their data (hypothesis testing and confidence intervals).

Post-Secondary Preparation

Career Tech

Level: 9th

Length: Quarter

Credit: .5

This course will focus on the use of software (MS Office) and career and college preparation. Students will also be introduced to the content of each SciTech STEM concentration.

Post-Secondary Prep 1

Level: 11th

Length: Quarter

Credit: .5

It is the goal of PSP1 to help prepare students for an enlightened and informed post-high school life. Student will begin to understand the pathways to desired careers through inquiry, self-reflection, and implementation. Students will be given the opportunity to explore their post-high school choices which include but are not limited to searching for colleges, understanding the process to apply for college, getting an overview financial aid and working on the college essay. Students will have the opportunity to maintain fictitious budgets, as well as be encouraged to seek out and gain an understanding of the world at large through the viewing of documentaries and follow-up discussions.

Post-Secondary Prep 2

Level: 12th

Length: Quarter

Credit: .5

This course is a quarter-length hybrid course taught to all senior students. The goal of PSP 2 is to continue the preparation for plans after high school. Specific attention will be given to resumes, college/trade/apprentice applications, essay writing and editing. Much of the course will build on what was accomplished in Post-Secondary Prep 1 during the 11th grade year.

Science

Big Ideas in Science – Biology

Level: 9th

Length: Semester

Credit: 1

This advanced learning course is filled with challenging content and engaging activities, aligned to the Pennsylvania Keystone Biology Standards. Beginning with the cell, students will begin a journey that challenges them to wrestle with Biology's great problems, past and present. Students will be challenged to demonstrate further growth in scientific inquiry and writing through extensive inquiry based activities. Major topics covered are macromolecules, cell structures and functions, genetic studies, evolutionary processes, and ecology.

Big Ideas in Science –Chemistry

Level: 9th, 10th

Length: Semester/Year

Credit: 1 / 2 (1 Science, 1 Elective)

This laboratory based approach to Chemistry is absolutely unique to Science and Technology Academy. Students begin the semester with a week and half long Chem-Blitz. This phase of the course ensures that all students begin on equal footing and closes any lingering physical science content gaps. Students will explore chemistry topics ranging from Matter to Acid-Base Titrations. Students will demonstrate growth in scientific discourse and writing. Highlights: Chem-Blitz, Popcorn Polka, Flame Ionization, Hog Hotel and Acids in Waterways.

Conceptual Physics

Level: 11th, 12th

Length: Semester

Credit: 1

Conceptual Physics engages students with analogies and scenarios from real-world situations to build a strong conceptual understanding of physical principles. With this strong conceptual foundation, students are better equipped to understand the equations and formulas of physics, and to make connections between the concepts of physics and their everyday world.

Keystone Prep

Level: 10th

Length: Semester

Credit: 1

Keystone Prep: The purpose of this course is to provide students with the opportunity to learn and develop a skill set necessary to master the core concepts of biology (listed below), while engaging in

hands-on laboratory experiments integrated throughout the course that support the core concepts listed below. It provides students with a multitude of learning techniques that integrate technology, student-driven learning, and investigative laboratories. It also provides opportunities for students to develop, record, and maintain evidence of their verbal, written, and graphic communication skills through laboratory reports and projects throughout the course.

Paleontology of the Mesozoic

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

This quarter-length elective will explore the biology, ecology and geology of the Mesozoic. The biological and ecological topics of evolution, convergent and divergent evolution, comparative anatomy, ecological niches, and symbioses will be examined through the life of the Mesozoic era. The concepts of plate tectonics, climate-influencing factors, fossilization and stratigraphy will be examined in studying how we know what we know about this era. Activities on comparative anatomy, animal behavior, the evolution of birds, and visits to the Carnegie Museum of Natural History's dinosaur exhibits will augment the learning of the students and connect learning to the life forms we see today.

Physics 1 AP

Level: 11th

Length: Semester

Credit: 1

Physics 1 AP is a semester-long science course and is the equivalent to a first semester college course in algebra-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; and mechanical waves and sound. It will also introduce electric circuits.

Physics 2C Mechanics AP

Level: 11th, 12th

Length: Semester

Credit: 1

This course is designed around the Advanced Placement course for physics (Physics C). One-half of the semester is devoted to mechanics. Use of calculus in problem solving and in derivations is expected to steadily increase as the course progresses. The second half of the Level C course focuses on classical electricity and magnetism. This course follows the suggested AP course outline. Many colleges and universities offer Advanced Placement and/or college credit to students who have performed successfully on the AP Physics C exam and students are encouraged to take the exam.

Science Forum

Level: All Levels

Length: Once per month each year

Credit: .75

90 minute block once per month. This ongoing forum will explore how science in the classroom connects to science outside the classroom. Guest presenters from an industry or a university setting share their experiences in an interactive format. With a focus on the connection between the nature of science and design cycles, Science Forum provides students with real-life examples of Executive Experiences.

University of Pittsburgh Biology

Level: 11th, 12th

Length: Semester

Credit: 1 Science, 1 Elective

The goal of this course is to provide students with a foundation in biology. This course focuses on a subset of major topics covered in Foundations of Biology I and II (BIOSCI 150, 160), including a review of chemistry as it applies to biology, the structure and function of macromolecules, the basic structure of cells, energy and cellular respiration, introduction to genetics and molecular biology, and development. While these topics are covered in high school Biology courses, Preparation for Biology delves deeper and applies chemistry concepts to achieve a more complete understanding of Biology. This, combined with practicing critical thinking skills, and primary literature and data analyses, prepares students for the rigors of the Foundations of Biology series.

University of Pittsburgh General Chemistry

Level: 11th, 12th

Length: Year

Credit: 1 Science, 1 Elective

This is the first half of a two-term introduction to general chemistry. Topics covered include stoichiometry, atomic and molecular structure and states of matter. Problem solving and laboratory experiences are a functional part of this course. Grades are determined by the student's performance on three exams, weekly quizzes, laboratory exercises and a comprehensive final. Five laboratory exercises, three exams and the comprehensive final will all be conducted at the University of Pittsburgh. A letter grade of an A or a B in Big Ideas in Science – Chemistry is required as a prerequisite for the course. The cost of this course is \$310, financial aid is available through the University of Pittsburgh.

Social Studies/Citizenship/Humanities

AP U.S. History

Level: 12th

Length: Semester

Credit: 1

In AP U.S. History students investigate significant events, individuals, developments, and processes in nine historical periods from approximately 1491 to the present. Students develop and use the same skills, practices, and methods employed by historians: analyzing primary and secondary sources; developing historical arguments; making historical comparisons; and utilizing reasoning about contextualization, causation, and continuity and change over time. The course also provides seven themes that students explore throughout the course in order to make connections among historical developments in different times and places: American and national identity; migration and settlement; politics and power; work, exchange, and technology; America in the world; geography and the environment; and culture and society.

Civics: Be the Change

Level: 9th

Length: Semester

Credit: 1

This course is built around topics considered vital to the development of educated citizens in the context of Pittsburgh. The following four themes run through this year-long course: 1) Understanding the Constitution and the Bill of Rights and their application to current issues; 2) How citizens generate change in society, government, and economics; 3) The relationship between local, state and national economic and policy issues; 4) A focus on Pittsburgh: Application of learning of above themes to the lives of Pittsburghers, past and present.

Psychology

Level: 11th, 12th

Length: Quarter

Credit: .5

In this introduction to psychology students will study how individuals learn, how they feel, how they experience the world, how they develop from birth through old age, and how they form relationships. Students will learn how to apply scientific methodology to the study of psychology and define some of the basic terminology of the discipline.

Sociology

Level: 11th, 12th

Length: Quarter

Credit: .5

This course includes the study of social institutions, organization, change, and culture. Students will be actively involved in examining institutions such as the family and education as well as the social effects of crime and poverty.

University of Pittsburgh CHS Western Civilization 101

Level: 11th
Length: Semester
Credit: 1

This is an introductory-level course in Western European History that handles topics from the Scientific Revolution to the Cold War. It provides a framework for those who will continue in the study of History, and it provides an overview for those seeking to fulfill “General Education” requirements. There are no prerequisites. This course will introduce major questions of historical process and it will emphasize chronological, comparative, and contextual reasoning and the construction of original arguments grounded in historical evidence. Each student will encounter and engage secondary and primary sources, assigned regularly throughout the course. They will participate in detailed discussions and debates about these sources. They should conduct independent research and develop original arguments to present verbally and/or in written form. Formal evaluations consist mainly of essay-based quizzes, midterms and a final exam. In all cases, students work to assimilate the different types of historical evidence and to develop their own interpretive analyses.

U.S. History

Level: 11th, 12th
Length: Semester
Credit: 1

Students examine significant events, people, institutions, movements and conflicts in American history in the late 19th and 20th centuries. Major topics include the struggle for minority groups and women to achieve equality and equal opportunity, the emergence of the U.S. on the world stage, and the impact of industrialization and global conflicts on U.S. institutions and people. A focus on social and political history is built into the instructional materials that accompany this course.

World History

Level: 11th, 12th
Length: Semester
Credit: 1

This course focuses on major themes, events and people in world history from roughly 1500 to the present. Topics include the growth of an interconnected world in the Age of Exploration, the impact of colonization, imperialism, and the growth of powerful nation states and clashes among them through 2 world wars. Also emphasized is the gradual push for expanding rights for more people around the world through the Age of Revolutions and colonial revolutions/ decolonization in the 20th century.

World Languages

Portuguese 1

Level: 11th & 12th

Length: Semester

Credit: 1

Portuguese 1 students develop listening and speaking skills and become familiar with the Portuguese-speaking world. Learning World Languages is an essential component of a 21st century global education.

Spanish 1

Level: 10th

Length: Semester

Credit: 1

In Spanish 1, the primary emphasis is on developing listening and speaking skills. Students also practice reading and writing. Students talk about everyday situations using simple questions and short answers at the phrase or memorized sentence level. Cultural awareness of the areas of the world where Spanish is spoken is an integral component of the course. This academic elective places students on the “Pathway to the Promise” and begins to prepare students for the 21st century global economy.

Spanish 2

Level: 10th

Length: Semester

Credit: 1

Spanish 2 expands the basic listening, speaking, reading, and writing skills so that students can begin to create with the language. Students participate in simple conversations and write brief descriptions on familiar topics. Students also gain a deeper appreciation of and sensitivity to the diverse cultures and customs of the Spanish speaking world. This academic elective places students on the “Pathway to the Promise” and continues to prepare students for the 21st century global economy.

Spanish 3

Level: 11th, 12th

Length: Semester

Credit: 1

In Spanish 3, students are able to create in Spanish at the sentence level, in survival situations such as ordering a meal, asking questions, telling what hurts. Students are able to describe and state opinions on familiar situational and cultural themes. Students engage in pair and group work. This intermediate level academic elective provides opportunities for enrichment, places students on the “Pathway to the Promise” and continues to prepare students for the 21st century global economy.

Spanish 4

Level: 11th, 12th

Length: Semester

Credit: 1

In Spanish 4, students begin to use more complex sentences and are increasingly able to speak about past, present and future events and survival topics. Students create skits or role plays, write personal journals, discuss values and opinions, and view and react to foreign language films and videos. Fine arts and history are integrated into the cultural component of the course. This high level academic elective provides opportunities for student enrichment, places students on the “Pathway to the Promise” and prepares students for the 21st century global economy.

University of Pittsburgh Spanish

Level: 12th

Length: Semester

Credit: 1

This course is Intermediate College Spanish 2. High School students will take this course instead of their standard fifth-year Spanish course. It is designed to develop communicative proficiency. This course builds and expands the language skills acquired in the first three semesters of college Spanish. It combines content-based language instruction with an interactive task-based approach and focuses in all relevant language skills: listening, speaking, reading and writing. Culture is integrated in all aspects of the program. Students who successfully complete the coursework will receive three credits from the University of Pittsburgh for SPAN 0004.

Body and Behavior Concentration & Electives

*denotes a required concentration course

Biomolecules/Genomics/Proteomics*

Level: 11th

Length: Semester (quarter 3 and 4)

Credit: .5

This course will provide an intensive approach to the biomedical sciences, specifically in the multi-disciplinary field of biology, biotechnology, anatomy and physiology. This course is designed to complete the preparation for the life sciences Executive Experience and to prepare the students for the Advanced Placement exam in biology if they wish to take it. This course evolves based on student interest with a focus on Anatomy and Physiology and diseases that affect these organ systems. Students that can connect concepts across the curriculum are better prepared to begin their undergraduate careers and will have the prerequisite skills needed for careers in health sciences. Students will be introduced to the world of databases and be able to link them to gene expression profiles on an organism level.

Cellular Communication and Signaling*

Level: 11th

Length: Quarter

Credit: .5

Students will explore the complex system of cellular communication that governs basic cellular activities and coordinates cellular actions within an organism. Topics will include cell structure and function, cell membrane, proteins, receptor function and structure, regulatory enzymes, informational processing, and the signaling pathways that govern growth and differentiation. Students will focus on the brain and nervous system in collaboration with colleagues from the University of Pittsburgh

Diseases and Immunity*

Level: 10th

Length: Quarter

Credit: .5

Students will investigate infectious diseases and how they function including disease classification, agents and host pathogens, disease transmission, infections and symptoms, and the concept and knowledge of resistance and immune responses of humans to infection. The role of phagocytic cells, complement, lymphocytes, the development of humoral and cell mediated immunity at the molecular, cellular, and organ level will be covered along with methods of developing vaccines and potential drug therapies. Students will read the text THE HOT ZONE which outlines the ebola virus outbreak in the 1960's through 2015 and be able to identify the important components of managing an outbreak.

Forensics

Level: 10th, 11th, 12th

Length: Quarter
Credit: .5

In this course students will study human anatomy and basic physiology and apply those skills to areas focused in forensic science. Students will specifically study: forensic anthropology, osteology, odontology, forensic science, laboratory analysis, field methods, and how to write reports. In addition, they will use biotechnology skills to investigate mock crime scenes. Students will also learn the large scale applications of forensic science such as: disasters, human rights, and POW/MIA recovery. This class is primarily a “hands-on” lab based class. This is an elective course.

Genetics

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

This course is an introduction to the basic concepts of genetics, in particular how they affect the world surrounding the students. The course is project based, with additional labs added for supplemental learning. Through this course the students will not only be able to understand the genetic terms and principles used in medical practices, but also the current research being discussed in the scientific community. Furthermore, through this course students will apply business and genetics principles to a real world application, in the form of a mock pet breeding business. This is an elective course.

Genetics and Heredity*

Level: 10th
Length: Quarter
Credit: .5

Students will engage in an active understanding of the molecular basis of life specifically the relationship of DNA, RNA and protein. Through inquiry based learning approaches, this course will lay the ground work for the subsequent curriculum on the specifics of how DNA and protein expression govern our life’s processes. Students will implement some of the technical skills learned in the introductory biotechnology course to study the mechanisms of adaptation and behavior and to understand how alteration of our DNA can affect our lives – specifically through genetic mutations. In addition, students will examine their own DNA for polymorphisms used in the real world to identify the ability to tolerate lactose, why vegetables taste bitter and the genetic relatedness of our species.

Human Pathology

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

This course explores the concepts of human anatomy through the lens of Pathology. Pathology is the study of how and why the body develops abnormal structures or functions improperly. Through the study of pathogens, students will have to learn the way the body is supposed to function. After learning

how the body is supposed to function or look, and how a pathogen causes a change, students will understand why particular treatments are recommended for particular pathogens. This course provides a connection between the life sciences and the physical sciences. The project for this course will allow the students to research extensively a new treatment option for a disease or pathogen, and present the class with their findings. This is an elective course.

Introduction to Biotechnology *

Level: 10th

Length: Quarter

Credit: .5

This course will be the starting point for a challenging and rewarding career in the high-tech field of biotechnology and the life sciences. An introduction to how biotechnology works, what laboratory techniques are used, what products are being made, what jobs in biotechnology are like, and what challenges biotechnology companies and laboratories here in the Pittsburgh area are working on will be emphasized. Students will develop good laboratory practice skills and be exposed first-hand to laboratory techniques such as micropipeting, gel electrophoresis, polymerase chain reaction, DNA restriction enzymes, molecular cloning, genetic engineering, DNA fingerprinting, bioinformatics, and other applied advanced techniques used in the biotechnology field.

Microbiology*

Level: 10th

Length: Quarter

Credit: .5

Students will master the basic principles of understanding and working with microorganisms. Students will learn the structure and function of bacteria, how to grow bacteria, identify bacteria, treat bacteria with antibiotics and design their own research experiment to study microorganisms in our environment. These concepts and skills will be related to diseases and function.

Tissue Engineering*

Level: 11th

Length: Quarter

Credit: .5

Regenerative medicine/tissue engineering is a rapidly growing multidisciplinary field that seeks to develop functional cell, tissue, and organ substitutes to repair, replace or enhance biological function that has been lost due to congenital abnormalities, injury, disease, or aging. Students will investigate the structural and functional differences exhibited by cells and tissues through various biotechnology techniques. Relationships will be developed from the cellular level to the organ level based on how engineered tissues can also be used in the life sciences.

Computers and Connections Concentration & Electives

*denotes a required concentration course

Advanced Programming in Computer Science*

Level: 11th
Length: Semester
Credit: 1

This is the capstone course taken by students in the Computers and Connections Concentration.

The overall goal of this course is to provide a strong foundation in the fundamental areas of programming while broadening participation in computing. Using the Java programming language the process of program design and analysis are explored. Topics covered include basic data types and their operators, I/O, control structures (selection, loops), classes (including methods and fields), files, arrays, and simple sorting and searching algorithms, inheritance, polymorphism and recursion.

This course will provide a solid foundation for continued study of Computer Science at the college level and will prepare students for the AP Computer Science A exam.

Arduino for ALL

Level: 10th, 11th, 12th
Length: Quarter
Credit: .5

This quarter-length elective is designed for students who are not in the C&C concentration and will serve as an introductory course to robotics using Arduino. The course will incorporate essential core competencies related to safety, basic electronics, and work from the Arduino starter guide. The second half of the course will consist of multiple projects in a PBL setting. Students will be presented with a list of problems/projects to select from and the students will be expected to produce or solve a problem using an Arduino and the tools at hand. In addition to actually creating the projects, students will be expected to document and demonstrate the process through which they complete in a medium that fits their learning style.

Hardware and Software Essentials*

Level: 10th
Length: Quarter
Credit: .5

Using Arduino, this course teaches the basics of Computer Science Hardware and Software. Students will get to build robots, gadgets, and wearable technology using sensors, motors and breadboards. Students will learn to develop systems that interact with the environment around them. By programming their own Arduino microcontroller to read inputs and produce outputs, students will be able to control LED flashing lights, switches, buttons, motors etc.

Original thinking is encouraged through project-based work and, in the case of Arduino, students are really only limited by their imagination!

Intermediate Programming & Computer Science*

Level: 11th

Length: Quarter

Credit: .5

The purpose of this course is to introduce students to an object-oriented programming language, such as Java. Topics include variables, control structures, data types, classes & methods. This course continues the study of problem-solving and fundamental computer science topics by moving to a more formal and in-depth study of programming design and methodology.

Intro to Programming

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

This quarter-length elective is designed to teach students with no prior background or interest in computer programming how to write code. The format and structure will follow that of Game Design, but where it differs from that class is pace. Intro to Programming will move quickly and cover a broader range of topics. Topics include: Objects and classes, method structure, class structure, variables, conditional programming, object interaction, iterators, loops, arrays, and more. By the end of the course, a student will be able to write and compile their own original program that solves a problem in their life.

Principles of Computing*

Level: 10th

Length: Quarter

Credit: .5

This a survey course that covers the key building blocks of computer science, including, hardware and software concepts, problem solving, social & ethical issues, algorithm development and computer programming. Students will learn real-world applications of programming and computer science through several hands-on projects with Python the language.

Programming for Web Applications/Advanced Web Design*

Level: 10th

Length: Quarter

Credit: .5

In this course, students take their web development skills from static to dynamic. Using the scripting language JavaScript, students will develop web-based graphical user interfaces (GUIs) that interact with

a database. The final project can include web applications incorporating graphics, databases and simulations with a stress on making interactive web experiences.

Programming in Context*

Level: 11th

Length: Quarter

Credit: .5

This is a project-based course, where students apply their programming knowledge to computational challenges in different fields, from mathematics and the sciences to the arts and humanities. Sample topics include computer graphics, social networking, computer music, Artificial Intelligence (AI) or Robotics.

Web Design*

Level: 10th

Length: Quarter

Credit: .5

This course covers the basic concepts, issues and techniques related to designing, developing and deploying web sites. In this introductory course students will learn to plan, code, test and check their pages for cross-browser compatibility and usability. Topics include Hypertext Markup Language (HTML5), cascading style sheets (CSS), tables, hyperlinks, images and forms.

Environment and Energy Concentration & Electives

*denotes a required concentration course

Case Studies in Pollution*

Level: 11th

Length: Semester

Credit: 1

In the final advanced semester of the E&E rotations, students will apply the concepts and skills from previous courses to examine in-depth the chemical and biological impacts of pollution. Air pollution will be examined through case studies focusing on smog, acid deposition, and air toxics as students conduct experiments involving acid rain, particulate matter, and tropospheric ozone levels. Water pollution will focus on case studies highlighting thermal, nutrient, chemical, and sediment pollution and will involve experimentation on the impacts of each of these on biological systems. The solid waste issues of nuclear byproducts and waste stream management will be examined with projects on the energy use of recycling and waste management. Throughout the course, the students will focus on determining possible sustainable solutions for each issue and will examine pollutant alternatives or mitigations.

Earth Systems and Resources*

Level: 10th

Length: Quarter

Credit: .5

This is the introductory class that will review students' prior knowledge to the basic concepts of ecosystems, biosphere, geosphere, and energy. In-depth projects will extend student knowledge of atmospheric and oceanic circulations, global convection patterns and impacts, volcanology, seismology, and mineral use, extraction and processing.

Ecological Anthropology

Level: 10th, 11th, 12th

Length: Quarter

Credit: .5

This course provides an introduction to biological anthropology, including the environmental and evolutionary factors which led to homo sapien. The course examines anthropology through the lens of genetics and evolutionary theory. Various theories will be discussed, as well as the fossil and biologic evidence used to support each theory. Finally the effects of environmental pressures on the development of cultures and language will be discussed.

Ecology- The Living World*

Level: 11th

Length: Quarter

Credit: .5

Students will study ecosystem structure and interactions; energy flow; diversity, succession and evolution; natural ecosystem change; and biogeochemical cycles. Students will participate in inquiry and project-based instruction to develop foundational knowledge about their environment, and develop laboratory and analytical skill. This course is taught in the fall semester so the outdoor learning environments of Schenley Park and SciTech’s gardens can be used to conduct experiments and collect ecological data.

Energy Resources*

Level: 10th
Length: Quarter
Credit: .5

Students will participate in a comprehensive study to compare and contrast the environmental, societal, and political impacts of various forms of energy, to include potential renewable energy options. Additionally, students will explore residential and industrial energy conservation opportunities.

Environmental Economics*

Level: 10th
Length: Quarter
Credit: .5

Students will study general population dynamics and associated issues with human population growth. Continued study will explore global economics impacted by environmental policy and practices.

Global Change*

Level: 11th
Length: Quarter
Credit: .5

Students will study the interconnected and interrelated systems that provide for the current lifestyle of humans. Through food and waste systems, students will learn the difference between a sustainable and non-sustainable system and how they impact climate and biodiversity through the concept of Ecological Footprint. Students will gain an appreciation of the processes involved with our food system by creating and maintaining a school garden.

Introduction to Environmental Science

Level: 10th
Length: Quarter
Credit: .5

Students outside the Environment and Energy Concentration will be able to round out their science experience. They will be introduced to basic environmental science concepts.

Land & Water Use*

Level: 10th

Length: Quarter

Credit: .5

Students will explore the ways in which humans utilize land and water for various resources and the environmental impacts of these efforts, along with experiments that investigate the impacts of soil erosion, nutrient pollution, and crop management techniques. The impact of agriculture, livestock operations, fisheries, and food processing will be examined through the lens of nutrient cycles, biodiversity loss, genetic engineering and pest management. Additional uses of land will also be examined through forestry management techniques and impacts, mineral extraction and processing, and the alteration of environments through urbanization. This course is taught in the spring in order to utilize SciTech's garden for experimentation on agricultural methods.

Form and Functions Concentration & Electives

*denotes a required concentration course

Applied Engineering Physics I*

Level: 10th

Length: Semester

Credit: 1

Engineers use their fundamental knowledge in science and mathematics to design solutions to problems that impact society. Applied Engineering Physics I is the first of three courses designed help students understand the direct correlation between physics and engineering by applying fundamental principles to the design and fabrication of mechanisms that solve specific challenges. Using the material science knowledge and fabrication techniques learned in Introduction to Engineering in conjunction with elementary lectures on topics not limited to kinematics, dynamics, linear momentum, oscillations, and energy, student groups perform design calculations and create original projects such as a catapult and a musical instrument. The use of pre-made kits and “click together” parts is prohibited as all projects are original and created with common building materials.

Applied Engineering Physics II*

Level: 11th

Length: Semester

Credit: 1

Using the same approach taken in its pre-requisite, Applied Engineering Physics II continues with the “Physics meets shop” philosophy to engineering and science education. Students are expected to again utilize their design and fabrication skills to create original open-ended projects that solve a problem or fulfill a need. Lectures in heat and temperature, thermodynamics, fluids, fluid dynamics, and optics compliment projects including but not limited to hydraulic arms and heat-engine powered boats. Group presentations are given by the students at the conclusion of each project to highlight its functions and unique features. Topics in modern physics including blackbody radiation, fission, and fusion are also introduced and studied.

Digital Electronics*

Level: Manager/Executive

Length: Semester

Credit: 1

DE is a semester-long course that covers the fundamentals of digital electronics. Topics covered include the operation of logic gates, Boolean algebra, circuit design, and microprocessors. Students will learn theory of digital electronics, simulate their activities on circuit design software, and then create working models of their circuits with the use of breadboard trainers. This is the fourth class in the Form & Function Concentration.

Introduction to Engineering Design*

Level: 10th

Length: Semester

Credit: .5

IED is a quarter-long introductory course that develops students' problem-solving and critical-thinking skills and emphasizes the concepts of developing three-dimensional models and solid renderings of an object. In addition to general information about engineering including the history, various disciplines, and ethics, students focus on the application of visualization processes and tools provided by current, state-of-the-art computer hardware and software programs. IED emphasizes the design-development process of a product and how a product model is produced, analyzed, and evaluated, using a Computer-Aided Design (CAD) System. Various design applications and possible career opportunities are explored and discussed in detail. This is the first class taken in the Form & Function Concentration.