

# 2018 APEA Course List

Courses meet daily unless otherwise noted. Full courses at Carnegie Mellon carry 9 to 12 units, corresponding to 3 to 4 credits at other U.S. colleges and universities. Students who reside in university housing must be enrolled in two full courses, while commuter students have the option to enroll in either one or two full courses. APEA students are limited to enrolling in **23 or fewer units** because all courses in this six-week summer term cover material from the longer fall and spring semesters.

Students who do enroll in 23 units may be expected to study challenging Carnegie Mellon academic material for at least 57 hours every week. We are instituted this policy in 2016 because we found students who enroll in excessive units cannot experience everything APEA has to offer. For more information, contact APEA Director Dr. William Alba ([alba@cmu.edu](mailto:alba@cmu.edu), 412-268-7333) or Senior Academic Advisor Veronica Peet ([vpeet@andrew.cmu.edu](mailto:vpeet@andrew.cmu.edu), 412-268-3750).

Newly listed courses for the APEA Program in 2018 include:

**06-052 Fundamentals of Chemical Engineering Practice**

**36-202 Methods for Statistical Data Science**

**76-246 Introduction to Shakespeare**

**\*79-318 Sustainable Social Change**

**This is a course list is dated 5-30-2018. Updates reflected in course list schedule reflected on page 2:**

Visit <http://cmu.edu/shs/apea/2018Courses.pdf> for up-to-date course availability and class times. Additional courses may be available during the university's concurrent Summer Session 2 for appropriately prepared students. The faculty member teaching the course and the APEA Director must authorize your choice. For a complete listing of available Summer Session 2 courses, contact Dr. William Alba or Veronica Peet.

Some of the courses in the following list are especially designated for APEA, and some involve a combined population of APEA students with regular degree students. In either case, all courses in the APEA Program offer the same quality of instruction and expectation of work as during the fall or spring at Carnegie Mellon.

After reviewing these course descriptions and, if needed, consulting by phone or email with the APEA Director or Senior Academic Advisor about course choices, select your courses using the **APEA Course Request Form in the Pre-College Portal**. Students will have access to the form through the portal once they are admitted to APEA.

**Courses fill in the order that deposits and forms are received by the university and the order that the course request form is completed.**

To view your course schedule, visit Student Information Online on the HUB's website ([www.cmu.edu/hub/sio](http://www.cmu.edu/hub/sio)) after acquiring your Carnegie Mellon University Andrew ID and password. Please allow time for various university offices to receive and process your deposit and enrollment forms.

Students may request schedule changes until the end of the second day of classes (July 3, 2018) by contacting the APEA Director or Senior Academic Advisor before arrival or by meeting one of them after the program begins. Students and their families are responsible for communicating to each other any changes in their academic plans.

**\* Students enrolled in this class are eligible for an extended program beyond the 6-week APEA summer session connecting students from the course with ongoing student projects, mentoring, advising, and continued association with Carnegie Mellon Faculty and Staff.**

<b>Units</b>	<b>Course#</b>	<b>Course Title</b>	<b>Meeting Times</b>
9	03-121E	Modern Biology	MTWRF 09:00a-10:20a
9	03-124E	Modern Biology Laboratory	MW 12:00p-12:50p AND MW 01:00p-02:50p
9	03-133E	Neurobiology of Disease	MTWRF 09:00a-10:20a
9	06-052E	Fundamentals of Chemical Engineering Practice	MWF 01:00PM-02:20PM AND TR 01:00PM-02:50PM
3	09-101E	Introduction to Experimental Chemistry	M 01:30p-02:20p AND W 01:30p-04:20p
10	09-105E	Introduction to Modern Chemistry I	MTWRF 09:00a-10:20a
10	<del>15-110E</del>	<del>COURSE FULL</del> Principles of Computing	MTWRF 09:00a-10:20a AND MTWRF 04:30p-05:20p
12	<del>*15-112E</del>	<del>COURSE FULL</del> Fundamentals of Programming and Computer Science	MTWRF 09:00a-10:20a AND MTWRF 05:30p-06:20p
10	<del>*15-122E</del>	<del>COURSE FULL</del> Principles of Imperative Computation	MTWRF 10:30a-11:50a AND MTWRF 03:00p-04:20p
12	18-100E	Introduction to Electrical and Computer Engineering	MTWRF 10:30a-11:50a AND MWF 03:00p-04:20p AND TR 01:30p-04:20p
10	21-120F	Differential and Integral Calculus	MTWRF 10:30a-11:50a
10	21-127E	Concepts of Mathematics	MTWRF 09:00a-10:20a
9	27-052E	Introduction to NanoScience and Technology	MWF 01:00p-02:50p
9	33-115E	Physics for Future Presidents	MTWRF 03:00p-04:20p
9	33-124E	Introduction to Astronomy	MTWRF 01:30p-02:50p
12	33-141E	Physics I for Engineering Students	MTWRF 12:30p-02:50p
12	33-142E	Physics II for Engineering and Physics Students	MTWRF 09:30a-11:50a
9	36-200E	Reasoning with Data	MWF 12:00p-01:20p AND TR 12:00p-01:20p
9	36-202E	Methods for Statistical Data Science	MWF 10:30a-11:50a AND TR 10:30a-11:50a
9	57-341E	Sound Recording Workshop	MWF 01:30p-02:50p AND MW 06:30p-07:50p
9	70-122E	Introduction to Accounting	MTWRF 10:30a-11:50a
9	73-102E	Principles of Microeconomics	MTWRF 09:00a-10:20a
9	76-101E	Interpretation and Argument – Video Games and Society	MWF 09:00a-11:20p
9	76-101F	Interpretation and Argument – Doctor Who? Social Justice and Public Health	MWF 03:00p-05:20p
9	76-246E	Introduction to Shakespeare	MWF 12:00p-2:20p
9	79-104E	Global Histories: Global Empire – Commerce, Finance, Naval – Rise and Fall of the British Empire	MTWRF 10:30a-11:50a
9	79-201E	Introduction to Anthropology	MTWR 06:00p-07:40p
9	79-318E	Sustainable Social Change: History and Practice	MWF 12:00p-1:20p
9	80-100E	Introduction to Philosophy	MTWRF 10:30a-11:50a
9	80-135E	Introduction to Political Philosophy	MTWRF 01:30p-02:50p
9	80-180E	Nature of Language	MTWRF 09:00a-10:20a
12	82-101E	Elementary French I	MTWRF 09:00a-10:20a
12	82-131E	Elementary Chinese I	MTWRF 10:30a-11:50a
12	82-171E	Elementary Japanese I	MTWRF 09:00a-10:20a
9	82-273E	Introduction to Japanese Language and Culture	MTWRF 12:00p-1:20p
9	85-102E	Introduction to Psychology	MTWRF 12:00p-01:20p
9	85-241E	Social Psychology	MTWRF 01:30p-02:50p

\* Placement into 15-112 and 15-122 requires appropriate scoring on the CS Placement test. Details are in course descriptions.

**03-121 Modern Biology (9 units)**

This is an introductory course that provides the basis for further studies in biochemistry, cell biology, genetics and molecular biology. This course emphasizes the chemical principles underlying biological processes and cell structures as well as the analysis of genetics and heredity from a molecular perspective. This is the introductory biology course for all science and non-science majors. 80-minute daily lecture.

**03-124 Modern Biology Laboratory (9 units)**

This laboratory is designed to introduce students to modern concepts in the biological sciences. The experiments illustrate many of the principles covered in 03-121 and 03-230. Experimentation using living organisms and/or their tissues, cells or molecules is an essential component of this course. 3-hour laboratory / lecture two times per week.

**03-133 Neurobiology of Disease (9 units)**

This course will explore the biological basis of several neurological and neuropsychiatric diseases, with an emphasis on medical diagnostic tools and techniques. It will include discussions of the anatomical basis of neurological diseases as well as recent research into understanding the mechanisms of disease. This course is intended to broaden students' understanding of how diseases are diagnosed and studied. Students will also learn how basic neurological and psychiatric evaluations are conducted and gain proficiency in these evaluation techniques. We will begin with a discussion of clinical neuroanatomy to serve as a basis for understanding brain structures and functional alterations in a variety of developmental, degenerative, neurological, and psychiatric disorders. Specific diseases covered may vary from year to year. 80-minute daily lecture.

**06-052 Fundamentals of Chemical Engineering Practice (9 units)**

This course provides advanced high school students with an introduction to Chemical Engineering practice. The course goals are: (1) to provide students with a broad knowledge of the engineering sciences Chemical Engineers utilize; (2) to increase facility with computational tools used by engineers; and (3) to apply chemical engineering sciences to problems in chemical process and product design. The course will cover a selection of topics, including mass and energy balances, Thermodynamics, Fluid Mechanics, Heat and Mass Transfer, and Unit Operations. Laboratory time will reinforce learning inductively and will feature open-ended problems. 80-minute lecture thrice weekly, 2-hour lab twice weekly.

**09-101 Introduction to Experimental Chemistry (3 units)**

This is a seven week chemistry laboratory course that is designed to introduce students to some basic laboratory skills, techniques, and equipment commonly used in experimental chemical investigations. The experiments will apply concepts in organic synthesis, quantitative analysis using visible spectrophotometry, kinetics, acid-base chemistry, thermochemistry, transition metal chemistry, chromatography, and protein biochemistry. The course is offered at no additional tuition charge to students enrolled in APEA. There is a \$50 lab fee for materials and supplies. 50-minute weekly lecture and 3-hour weekly laboratory.

**09-105 Introduction to Modern Chemistry I (10 units)**

This course begins with a very brief survey of some fundamental principles of chemistry and a presentation of chemically interesting applications and sophisticated problems. These will form the basis for introducing the relationships between the structure of molecules and their chemical properties and behavior. The subject matter will include principles of atomic structure, chemical bonding, intermolecular interactions and molecular structures of organic and inorganic compounds including some transition metal complexes. Relevant examples will be drawn from such areas as environmental, materials, and biological chemistry. 80-minute daily lecture.

### **15-110 COURSE FULL Principles of Computing (10 units)**

A course in fundamental computing principles for students with minimal or no computing background. Programming constructs: sequencing, selection, iteration, and recursion. Data organization: arrays and lists. Use of abstraction in computing: data representation, computer organization, computer networks, functional decomposition, and application programming interfaces. Use of computational principles in problem solving: divide and conquer, randomness, and concurrency. Classification of computational problems based on complexity, non-computable functions, and using heuristics to find reasonable solutions to complex problems. Social, ethical and legal issues associated with the development of new computational artifacts will also be discussed. 80-minute daily lecture and 50-minute daily recitation.

### **15-112 COURSE FULL Fundamentals of Programming and Computer Science (12 units)**

A technical introduction to the fundamentals of programming with an emphasis on producing clear, robust, and reasonably efficient code using top-down design, informal analysis, and effective testing and debugging. Starting from first principles, we will cover a large subset of the Python programming language, including its standard libraries and programming paradigms. We will also target numerous deployment scenarios, including standalone programs, shell scripts, and web-based applications. This course assumes no prior programming experience. Even so, it is a fast-paced and rigorous preparation for 15-122. Students seeking a more gentle introduction to computer science should consider first taking 15-110. NOTE: students must achieve a C or better in order to use this course to satisfy the pre-requisite for any subsequent Computer Science course. 80-minute daily lecture and 50-minute daily recitation.

**Note on 15-110 vs. 15-112:** Both courses are introductory, assuming no prior programming experience. If you are certain at this time that you want to study Electrical and Computer Engineering (ECE) or Computer Science (CS) as a major or minor during college, or if you want to devote an immense amount of time during the summer doing programming, you should consider 15-112. On the other hand, if you are exploring the possibility of majoring in CS or ECE, intend to apply CS primarily towards other areas, or want to get a broad sense of computer science and how computer scientists approach problems, 15-110 is much more appropriate for you.

**Computer Science Placement Exam:** To ensure students are placed in the correct CS courses, APEA students who seek to enroll in 15-112 or in 15-122 must complete a CS placement exam administered by CMU. Information about this exam will be sent to students who have listed 15-112 or 15-122 on their online course request forms. Students will be enrolled in these courses only after their placement exams are scored.

### **15-122 COURSE-FULL Principles of Imperative Computation (10 units)**

For students with a basic understanding of programming (variables, expressions, loops, arrays, functions). Teaches imperative programming and methods for ensuring the correctness of programs. Students will learn the process and concepts needed to go from high-level descriptions of algorithms to correct imperative implementations, with specific application to basic data structures and algorithms. Much of the course will be conducted in a subset of C amenable to verification, with a transition to full C near the end. This course prepares students for 15-213 and 15-210. NOTE: students must achieve a C or better in order to use this course to satisfy the pre-requisite for any subsequent Computer Science course. Prerequisites: 15-112 or equivalent (such as a 5 on the AP Computer Science exam). **All students enrolled in 15-122 must have completed 21-127 (Concepts of Mathematics) previously, or be enrolled in 21-127 this summer.** 80-minute daily lecture and 80-minute daily recitation.

**Computer Science Placement Exam:** To ensure students are placed in the correct CS courses, APEA students who seek to enroll in 15-112 or in 15-122 must complete a CS placement exam administered by CMU. Information about this exam will be sent to students who have listed 15-112 or 15-122 on their online course request forms. Students will be enrolled in these courses only after their placement exams are scored.

### **18-100 Introduction to Electrical and Computer Engineering (12 units)**

The goals of this freshman engineering course are: To introduce basic concepts in electrical and computer engineering in an integrated manner; To motivate basic concepts in the context of real applications; To illustrate a logical way of thinking about problems and their solutions, and; To convey the excitement of the profession. These goals are attained through analysis, construction and testing of an electromechanical system (e.g., a robot) that incorporates concepts from a broad range of areas within Electrical and Computer Engineering. Some of the specific topics that will be covered include system decomposition, ideal and real sources, Kirchhoff's Current and Voltage Laws, Ohm's Law, piecewise linear modeling of nonlinear circuit elements, Ideal Op-Amp characteristics, combinational logic circuits, Karnaugh Maps, Flip-Flops, sequential logic circuits, and finite state machines. Prerequisite: high school technical course such as chemistry or physics. NOTE: we will assume students have knowledge of complex numbers in rectangular and polar forms, can convert between the two, and can add, subtract, multiply and divide complex numbers. Junior or senior standing in high school required, senior is preferred. This is the same rigorous course required of entering ECE majors. 80-minute daily lecture, 80-minute recitation thrice weekly and 3-hour laboratory session twice weekly.

### **21-120 Differential and Integral Calculus (10 units)**

Functions, limits, derivatives, logarithmic, exponential, and trigonometric functions, inverse functions; L'Hospital's Rule, curve sketching, Mean Value Theorem, related rates, linear and quadratic approximations, maximum-minimum problems, inverse functions, definite and indefinite integrals, and hyperbolic functions; applications of integration, integration by substitution and by parts. Contact the APEA Director or Advisor if you have questions about preparation. This is the first main calculus course at Carnegie Mellon. Students who have successfully completed AP Calculus AB or an equivalent course should enroll in a different mathematic course. 80-minute daily lecture.

### **21-127 Concepts of Mathematics (10 units)**

This course introduces the basic concepts, ideas and tools involved in doing mathematics. As such, its main focus is on presenting informal logic, and the methods of mathematical proof. These subjects are closely related to the application of mathematics in many areas, particularly computer science. Topics discussed include a basic introduction to elementary number theory, induction, the algebra of sets, relations, equivalence relations, congruences, partitions, and functions, including injections, surjections, and bijections. A basic introduction to the real numbers, rational and irrational numbers. Supremum and infimum of a set. 80-minute daily lecture.

### **27-052 Introduction to NanoScience and Technology (9 units)**

This course is offered within Carnegie Mellon's Advanced Placement Early Admissions (APEA) program. The course is primarily intended to provide an introduction to nanoscience and technology to a wide audience of students at the advanced high school to incoming freshmen level. The course goals are twofold: (1) to provide students with a holistic view of the objectives, opportunities and challenges of the emerging field of nanotechnology and 2) to sensitize students at an early stage of their career to the relevance of the connections among the traditional disciplines as a vital element to the progress in interdisciplinary areas such as nanotechnology. The course will cover: Introduction and fundamental science; Preparation of nanostructures; Characterization of nanostructures; Application examples, Social and ethical aspects of nanotechnology. Admission according to APEA guidelines. 110-minute meetings three times per week.

### **33-115 Physics for Future Presidents (9 units)**

Countless topics of social and political importance are intimately related to science in general and physics in particular. Examples include energy production, global warming, radioactivity, terrorism, and space travel. This course aims to provide key bits of knowledge based on which such issues can be discussed in a meaningful way, i.e., on the level of arguments and not just vague beliefs. We will cover an unusually wide range of topics, including energy, heat, gravity, atoms, radioactivity, chain reactions, electricity, magnetism, waves, light, weather, and climate. No calculus or algebra will be required. The course is open for all students at CMU. 80-minute daily lecture.

### **33-124 Introduction to Astronomy (9 units)**

Astronomy continues to enjoy a golden age of exploration and discovery. This course presents a broad view of astronomy, straightforwardly descriptive and without any complex mathematics. The goal of the course is to encourage non-technical students to become scientifically literate and to appreciate new developments in the world of science, especially in the rapidly developing field of astronomy. Subjects covered include the solar system, stars, galaxies and the universe as a whole. The student should develop an appreciation of the ever-changing universe and our place within it. Computer laboratory exercises will be used to gain practical experience in astronomical techniques. In addition, small telescopes will be used to study the sky. This course is specifically geared toward non-science/engineering majors. 80-minute daily lecture.

### **33-141 Physics I for Engineering Students (12 units)**

This is a first semester, calculus-based introductory physics course. Basic principles of mechanics and thermodynamics are developed. Topics include vectors, displacement, velocity, acceleration, force, equilibrium, mass, Newton's laws, gravitation, work, energy, momentum, impulse, torque and angular momentum, temperature, heat, equations of state, thermodynamic processes, heat engines, refrigerators, first and second laws of thermodynamics, and the kinetic theory of gases. Prerequisites: high school calculus course, concurrent enrollment in 21-120, or a 5 on the AP AB Calculus exam. 80-minute daily lecture and 80-minute daily recitation.

### **33-142 Physics II for Engineering and Physics Students (12 units)**

This is the second half of a two-semester calculus-based introductory physics sequence for engineering and physics students. Two fifths of the course covers electricity, including electrostatics and electric fields, Gauss' law, electric potential, and simple circuits. Two fifths cover magnetism, including magnetic forces, magnetic fields, induction and electromagnetic radiation. One fifth of the course covers mechanical waves (including standing and traveling waves, superposition, and beats) and electromagnetic waves (including mode of propagation, speed, and other properties). Prerequisites: A score of 5 on the AP AB or BC Calculus exams. Completion of a physics course in mechanics or equivalent course in high school (5 in AP Physics C: Mechanics) is required. 80-minute daily lecture and 80-minute daily recitation.

### **36-200 Reasoning with Data (9 units)**

This course will serve as an introduction to learning how to "reason with data". While still an introductory-level course in the Statistics Department, the focus will be more on thinking about the relationship between the application and the data set and extracting useful statistical information rather than taking primarily a formula-driven approach. There will be an emphasis on thinking through an empirical research problem from beginning to end. Types of data will include continuous and categorical variables, images, text, and networks. Applications will largely be drawn from interdisciplinary case studies spanning the humanities, social sciences, and related fields. Methodological topics will include basic exploratory data analysis, elementary probability, hypothesis tests, and empirical research methods. There is no calculus or programming requirement. There will be weekly computer labs for additional hands-on practice. 80-minute daily lecture.

### **36-202 Methods for Statistics and Data Science (9 units)**

This course builds on the principles and methods of statistical reasoning developed in 36-200 (or its equivalents). The course covers simple and multiple regression, analysis of variance methods and logistic regression. Other topics may include non-parametric methods and probability models, as time permits. The objectives of this course is to develop the skills of applying the basic principles and methods that underlie statistical practice and empirical research. Learning the Data Analysis Pipeline is strongly emphasized through structured coding and data analysis projects. In addition to three lectures a week, students attend a computer lab twice a week for "hands-on" practice of the material covered in lecture; students will learn the basics of R Markdown and related analytics tools. 80-minute daily lecture.

### **57-341 Sound Recording Workshop (9 units)**

Centers around the new recording studio in the School of Music: how the studio works and how to record various types of music, using the recording studio and the Kresge Recital Hall, which has audio and video links to the recording studio. The method of instruction is to learn by doing, and the goal is to achieve professional-sounding results. Equipment includes a complete 24-track Pro-Tools system, professionally designed control room and an interesting array of microphones. All recording is direct to hard disc. The lecture portion will cover the basics of sound, wave propagation, human hearing, psychoacoustics, transducers (microphones and speakers), mixing consoles, signal processors, digital and analog recording systems and signal flow. There are no specific prerequisites for the course, although reading music and/or playing an instrument is helpful. 80-minute lecture three times per week, 3-hour lab twice weekly.

### **70-122 Introduction to Accounting (9 units)**

This course provides the knowledge and skills necessary for the student to understand financial statements and financial records and to make use of the information for management and investment decisions. Topics include: an overview of financial statements and business decisions; the balance sheet, the income statement, and the cash flow statement; sales revenue, receivables, and cash; cost of goods sold and inventory; long-lived assets and depreciation, and amortization; current and long-term liabilities; owners' equity; investments in other corporations; an introduction to financial statement analysis and international issues dealing with financial statements. 80-minute daily session.

### **73-102 Principles of Microeconomics (9 units)**

A one-semester course that teaches the fundamentals of microeconomics. Students will learn how microeconomic analysis can explain market successes, market failures, and how government intervention might improve outcomes. In addition to an investigation of firm behavior and consumer behavior, attention will be paid to: Game Theory, Behavioral Economics, Economics of Time and Risk, Economics of Information, Experimental Economics, and Auctions and Market Design. Students will also learn how to integrate basic data analysis and statistics. 80-minute daily session.

### **76-101 Interpretation and Argument (9 units)**

76-101 introduces first-year students to an advanced, inductive process for writing an argument from sources. Because the course is based upon empirical research about professional academic writers, students will learn expert practices for authoring their own arguments that contribute to an existing community of authors. Because reading and writing are inseparable practices for academic writing, students will read a variety of texts so that they can explore and critically evaluate a single issue from multiple perspectives and from different disciplinary genres. Students will learn methods for summarizing, synthesizing, and analyzing arguments within that issue so that they may contribute an argument of their own. The course is also geared toward helping students understand the requirements of advanced college-level writing. Our students are typically very accomplished readers and writers, and we are eager to push their accomplishments toward greater excellence. For this purpose, students will build upon their composing knowledge by reflecting and thinking strategically as they plan, write, and revise their own texts. Ultimately, they will develop critical reading, rhetorical and linguistic practices for analyzing and producing texts within the context of an academic community. Each section of 76-101 is structured by the same objectives and core assignments. There is a core vocabulary and set of heuristics that all sections teach. 80-minute daily session.

### **Section E: *Video Games and Society***

In 2014, a series of events now referred to as Gamergate revealed widespread misogyny throughout the larger male-dominated gaming community. Initially debating the ethics of video game journalists, the conversation became loaded with violent threats and the defamation of female video game developers. While the outcome of Gamergate is still hotly debated in relation to the parties involved, one thing was made clear: video games are no longer a niche interest. With over half of the American population reported to play video games, they now outsell the global box office, making video games a new dominant form of media. The virtual societies of video games enable us to participate in experiences difficult to capture through other means, while also paralleling

real world power structures and prejudices. How can we understand video games as tools for social change? How does a post-Gamergate gaming community move forward without abandoning the work of the past? How do we define video games? In terms of goals, interaction, or technology? The goal of this class is to investigate these questions surrounding video games, while also considering issues of race, gender, and sexual orientation in relation to the history of video games. The course requires no previous knowledge of or experience with video games, and some assignments will include playing relevant games that highlight the issues we'll be discussing in our readings. We will read various articles addressing the sociological issues of games, and students will be asked to write their own papers analyzing, critiquing, and synthesizing these perspectives, leading to a final paper where they will craft their own contribution on how we can understand video games as tools for sociological reflection and progress.

### **Section F: *Doctor Who? Social Justice and Public Health***

As we anticipate Trump's White House, a matter of paramount concern is the state of public health care in the United States. During his campaign, Trump pledged to repeal the Affordable Care Act (commonly referred to as Obamacare), claiming that it results from unilateral party politics as well as places an undue burden on an individual's self-determination. Trump's comments are but the latest in a century-long debate concerning the legitimacy of government intervention within the domain of public health. Beginning in 1905, when the United States Supreme Court ruled in *Jacobson v Massachusetts* that states had the authority to enforce mandatory vaccinations when "necessary for public health or safety," we have witnessed increases in public health legislation and policy, which have spurred controversies surrounding the ramifications of government-regulated health initiatives. For some, public health policies are a matter of social justice, representing a way to prevent millions of unnecessary deaths and build stronger, healthier communities. For others, these policies point to gross intrusions on individual liberties and freedoms. Others still claim that in their attempts to be universal, public health policies often neglect the unique sociocultural conditions that influence a community's health practices. This section of 76-101 examines the controversies surrounding public health by tracing possible moral, ethical, and sociopolitical implications of public health policies. Through critically examining popular and academic texts regarding government-lead health initiatives, students will learn and practice the analytical skills necessary to understand and responsibly contribute to this complex social issue, which affects every one of us.

By the time students complete this course, they will be able to analyze the rhetorical structure of multifaceted arguments; synthesize the major perspectives regarding the course topic; and, finally, contribute to the on-going academic conversation by researching and/or analyzing a public health policy of their choosing. Along with acquiring a robust understanding of the course content, students will end the semester with an inventory of strategies for constructing persuasive, authoritative, and reader-friendly prose.

### **76-221 Books (By Women) You Should Have Read By Now (9 units)**

In this course, we will explore several works of literature by women writers that everyone should read in their lifetime. Some of these works, like Jane Austen's *Pride and Prejudice* and Daphne Du Maurier's *Rebecca*, have been some of the most commercially successful novels of all time. Others, like Mary Shelley's *Frankenstein*, helped create entire genres of fiction. Still others, like Harper Lee's *To Kill A Mockingbird*, are amongst the most controversial and banned works ever written. As we read, we will discuss: what is the "literary canon" how does it relate to cultural capital? In what ways have women writers influenced literary and cultural production? In what ways can these vibrant texts engage with important issues of their (and our) time, like gender, race, sexuality, nationality and class? Instructor lectures will additionally introduce other cultural and historical materials like visual arts, periodicals, music, film, letters, and secondary criticism in order to enhance students' experiences with these literary works by women. 140 minute session three times per week.



### **76-246 Introduction to Shakespeare (9 units)**

This 200-level course will provide students with an introduction to the major works of William Shakespeare. As we read through the plays together, we will endeavor to understand what--and how--they meant in their original context, thereby developing a historically informed perspective on their influence over our own cultural landscape. 140 minute session three times per week.

### **79-104 Global Histories – Global Histories: Global Empire: Commerce, Finance, and Naval Power in the Rise & Fall of the British Empire (9 units)**

Human activity transcends political, geographical, and cultural boundaries. This course provides students with an opportunity to develop the skills and perspectives needed to understand the contemporary world through investigating its global history. Great Britain at the height of its power controlled a quarter of the world's population, a fifth of its dry surface, and mastery across its oceans. The British Empire operated as a vast network of people, institutions, commercial interests, and commodities that fueled Britain's rising geopolitical importance and made London the financial capital of the world through the First World War. Often relying on the power of the Royal Navy, the Empire incorporated far-flung territories into this web of interconnectedness and unleashed what we now call "globalization." Using the writings of historians, as well as primary sources such as newspapers, travel accounts, letters, and literature, "Global Empire" will follow the development of the British Empire from the sixteenth century to its demise after the Second World War. We will pay particular attention to the way Britain's economic interests shaped its imperial project. Thus, the course will explore topics such as colonial commodities, slavery, imperialism, naval power, free trade, and war in the Americas, Asia, Africa, and the British Isles. Ultimately, students will not only be able to recognize and assess the role of the British Empire in the development of "globalization," but will also be able to identify the ways that economic interests shape state policy in the world we live in today. 80-minute daily session.

### **79-201 Introduction to Anthropology (9 units)**

How do societies make meaning? Is culture a set of shared values or are these values continuously negotiated, altered, and adjusted? How do individuals and societies account for change and how do they aim to incorporate it into their values? This course introduces students to anthropological approaches to these questions. Readings will draw on case studies from very different settings: from a ruined city in Brazil to interethnic conflict in Cyprus, oil and chocolate in post-Soviet Russia, pyramid schemes in postsocialist Romania, and vampires stories in East and Central Africa. We will assess the advantages and pitfalls of comparing cross-cultural data, analyze the workings of power within and between societies, and consider the politics of cultural representations. We will also discuss the anthropologist's relationship to the people s/he studies, and the responsibilities inherent in that relationship. Throughout the course, students will learn the importance of a historical perspective on culture, looking at how and why societies change, and considering how we, as anthropologists, should assess these changes.

### **79-318 Sustainable Social Change: History and Practice (9 units)**

If you wanted to change the world, who would you ask for guidance? Mahatma Gandhi, Martin Luther King, Mother Theresa, Rachel Carson, or Nelson Mandela? In this interdisciplinary course, we will examine the history of efforts to create sustainable social change. Through a series of targeted case studies, we will examine the successes and failures of notable leaders, past and present, who strove to address social problems nonviolently and to create lasting improvements in fields such as education, healthcare, and human rights. In keeping with the example of the people we will be studying, we will bring our questions and our findings out of the classroom through a variety of creative, student-driven experiments in sustainable social change. 80-minute daily session. **Students enrolled in this class are eligible for an extended program beyond the 6-week APEA summer session connecting students from the course with ongoing student projects, mentoring, advising, and continued association with Carnegie Mellon Faculty and Staff.**

### **80-100 Introduction to Philosophy (9 units)**

In this introductory course we will explore three major areas of Philosophy: Ethics, Metaphysics, and Epistemology. Accordingly the course is divided into three sections. In each section we will read primary sources and discuss some of the main philosophic problems associated with that area. These will include: moral problems (Ethics), problems rising from the debates about free-will, personal identity or intelligence (Metaphysics), and inquiries about the scope and limits of human knowledge (Epistemology). We will then introduce some theories designed to solve such problems, and try to understand the strengths and weaknesses of these theories. We will apply different techniques and theories to issues that we might encounter in the real world. We will use class discussions, homeworks and papers to learn skills for evaluating arguments. These skills include: how to present a philosophic argument, what are the assumptions that justify it, what are its weaknesses and its strengths, whether such weaknesses can be resolved and, if they cannot be resolved, why. 80-minute daily session.

### **80-135 Introduction to Political Philosophy (9 units)**

As an introductory course, we will seek to trace out the historical and philosophical dimensions of the polis from its origins in Ancient Greece to its current manifestation in present-day society. Special emphasis will be placed on the concept and practice of "democracy." We'll begin with the history of political philosophy from Plato and Aristotle (two of the early critics of democracy) to the modern period and the arguments in support of "republicanism" as found in the Federalist Papers (Madison, Jay, Hamilton). These historical moments cast light on the philosophy behind the development of the US constitution. Following Ketcham, we'll discuss the debate between the "ancients and moderns," enlightenment ideas regarding liberty and equality as well as the distinction between private rights and public goods. After presenting some fundamental justifications for democracy and our current models of democratic governance, we'll study the basic political frameworks of our day through a thorough-going analytic analysis of the writings and arguments of recent and contemporary political philosophers such as John Rawls, Ronald Dworkin, Robert Nozick, Charles Talyor, Michael Sandel, and Annette Baier. The course will end with a discussion of the theory and practice of deliberative democracy and a chance for students to engage in this model of democracy through the activities of an ersatz "deliberative poll." 80-minute daily session.

### **80-180 Nature of Language (9 units)**

Language is used to talk about the world or to describe it, but how do we go about describing language itself? Linguistics is the name given to the science of language, whose task it is to give such a description. The discipline of linguistics has developed novel tools for describing and analyzing language over the last two hundred years and in this course we learn what these tools are and practice applying them. Sub-areas of linguistics which we study include phonetics (the study of speech sounds), phonology (the study of sound systems), morphology (the study of parts of words), and syntax (the study of combinations of words). Beyond this, we look at changes in language over time, and we consider the puzzle of linguistic meaning. The methods of linguistics are useful in the study of particular languages and in the study of language generally, so this course is useful for students of foreign languages as well as those interested in going on to study language acquisition, psycholinguistics, sociolinguistics, philosophy of language, and computer modeling of language. 80-minute daily session.

**The following language courses have no prerequisites.** Additional Modern Language courses are available at the Elementary, Intermediate, and Advanced levels in French, Spanish, Japanese, Arabic, Chinese, and Italian. If interested, contact Veronica Peet ([vpeet@andrew.cmu.edu](mailto:vpeet@andrew.cmu.edu)) or Dr. William Alba ([alba@cmu.edu](mailto:alba@cmu.edu)).

**82-101 Elementary French I (9 units)**

This course is for students with no prior experience in French. Using a proficiency-oriented approach, students will develop contextually appropriate interpersonal communication skills in both written and spoken French, develop reading and listening skills through the use of various media, understand fundamental grammar, acquire vocabulary, and gain a basic understanding of French and francophone cultures through class activities. Regular homework, quizzes, tests, presentations, and class participation are mandatory (four in-class hours per week). The elementary level is also designed to help students learn to reflect and draw upon strategies used by good language learners in their second language study. A student with prior experience in French must take the placement exam. 80-minute daily session.

**82-131 Elementary Chinese I (12 units)**

This course is for students with no prior experience in Chinese. Using a proficiency-oriented approach, students will develop contextually appropriate interpersonal communication skills in both written and spoken Chinese, develop reading and listening skills through various media, understand fundamental grammar, acquire vocabulary, and gain a basic understanding of Chinese cultures through class and extracurricular activities. Regular homework, quizzes, tests, and participation in class are mandatory (four in-class hours per week). Students will learn the phonetic transcriptions of Chinese (Pinyin) for speaking and listening as well as Chinese characters for reading and writing. The elementary level is also designed to help students learn to reflect and draw upon strategies used by good language learners in their second language study. A student with prior experience in Chinese must take the placement exam. 80-minute daily session.

**82-171 Elementary Japanese I (12 units)**

This course is the first part of a two-semester course sequence (82-171, 82-172) for students with no prior experience in Japanese. It emphasizes the development of communicative language proficiency through oral practice, aural comprehension, reading, writing, and the study of cultural aspects of Japanese society. Regular homework, quizzes, tests, presentations, and class participation are mandatory (four in-class hours per week). The elementary level is also designed to help students learn to reflect and draw upon strategies used by good language learners in their second language study. A student with prior experience in Japanese must take the placement exam. 80-minute daily session

**82-273 Introduction to Japanese Language and Culture (9 units)**

This course is an introduction to modern Japanese. Given the close link between the Japanese language and culture, the examination of the distinctive characteristics of the Japanese language and its sociocultural context provides important insights into contemporary Japan. This course is taught in English and is intended both for individuals who want to gain a better understanding of modern Japanese society, as well as for students of the Japanese language. 80-minute daily session.

**The above language courses have no prerequisites.** Additional Modern Language courses are available at the Elementary, Intermediate, and Advanced levels in French, Spanish, Japanese, Arabic, Chinese, and Italian. If interested, contact Veronica Peet ([vpeet@andrew.cmu.edu](mailto:vpeet@andrew.cmu.edu)) or Dr. William Alba ([alba@cmu.edu](mailto:alba@cmu.edu)).

**85-102 Introduction to Psychology (9 units)**

This course examines major areas of scientific psychology in some depth, the attempt being to develop basic models of our behavior and thought that explain wide areas of our functioning. The primary focus is on the areas of neural and motivational control of behavior, memory and thought, social interaction, and psychological development. Specific topics within these areas include brain function, motivational control systems, learning, cognitive and perceptual information processing, problem solving, obedience and conformity, social interaction, emotion, attitude consistency and change, how our social, cognitive and language functions develop, the importance of childhood to adult functioning, and psychopathology. In addition to the lecture, the course includes a weekly recitation section meeting and weekly short WEB-based laboratory experiences in which students get to perform actual experiments, interpret real data, and experience many psychological phenomena. 80-minute daily session.

**85-241 Social Psychology (9 units)**

The focus of this course will be on how peoples behavior, feelings and thoughts are influenced or determined by their social environment. The course will begin with lectures and readings on how social psychologists go about studying social behavior. Next, various topics on which social psychologists have done research will be covered. These topics will include: person perception, prejudice and discrimination, the nature of attitudes and how attitudes are formed and changed, interpersonal attraction, conformity, compliance, altruism, aggression, group behavior, and applications of psychology to problems in health care, law, politics, and the environment. Through readings and lectures on these topics, students will also be exposed to social psychological theories. 80-minute daily session.

For the most recent updates to this course list and schedule, see: <http://cmu.edu/shs/apea/2018Courses.pdf>

**This is a course list is dated 5-30-2018. Updates reflected in course list schedule reflected on page 2:**

**Course Time Change:**

79-201E Introduction to Anthropology MTWRF 01:30p-02:50p (Updated 2-21-18)

73-102E Principles of Microeconomics MTWRF 09:00a-10:20a (Updated 4-24-18)

79-201E Introduction to Anthropology MTWR 06:00p-07:40p (Updated 4-24-18)

**Course Added:**

73-102E Principles of Microeconomics (Updated 4-6-18)

**Course Description Updated:**

36-202 Methods for Statistics and Data Science (Updated 2-21-18)

76-101E Interpretation and Argument - Video Games and Society (Updated 4-6-18)

76-101F Interpretation and Argument - Doctor Who? Social Justice and Public Health (Updated 4-6-18)

**Course Deleted:**

36-309E Experimental Design for Behavioral and Social Sciences (Updated 2-21-18)

80-242E Conflict and Dispute Resolution (Updated 4-6-18)

76-221E Books (by Women) You Should Have Read By Now (Updated 5-18-18)

21-127F Concepts of Mathematics (Updated 5-22-18)

**Course Full:**

15-122 Principles of Imperative Computation (Updated 4-13-18)

15-110 Principles of Computing (Updated 5-22-18)

15-112 Fundamentals of Programming and Computer Science (Updated 5-30-18)

**Time Corrected:**

79-104 Global Histories MTWRF (10:30a-11:50a) (Updated 5-18-18)

76-101E Interpretation and Argument: Video Games (MWF) 09:00a-11:20a (Updated 5-30-18)

76-101F Interpretation and Argument: Dr. Who (MWF) 03:00p-05:20p (Updated 5-30-18)

**Units Corrected:**

15-110E Principles of Computing (10 units) (Updated 4-6-18)

If you have questions about scheduling, please contact:

Dr. William Alba, APEA Director

Email: [alba@cmu.edu](mailto:alba@cmu.edu)

Phone: 412-268-7333 (campus extension 8-7333)

Office: Doherty Hall 2201

Carnegie Mellon University, 5000 Forbes Ave.

Mellon College of Science, 1324 Doherty Hall

Pittsburgh, PA 15213

OR

Ms. Veronica Peet, APEA Senior Academic Advisor

Email: [vpeet@andrew.cmu.edu](mailto:vpeet@andrew.cmu.edu)

Phone: 412-268-3750 (campus extension 8-3750)

Office: Wean Hall 6814

Carnegie Mellon University, 5000 Forbes Ave.

Mellon College of Science, 1324 Doherty Hall

Pittsburgh, PA 15213

Schedule changes may also be discussed upon your arrival on campus. Course changes become official only after discussion with Dr. Alba or Ms. Peet.

**After being accepted to the APEA program, you will be enrolled in courses only after you confirm your attendance.**

APEA students are enrolled in courses after the university processes your enrollment forms and deposit, and after the APEA Program receives your **APEA Course Request Form in the Pre-College Portal**.

In addition, students seeking to enroll in 15-112 or 15-122 must have their CMU CS placement exams completed and scored.

**Students will be enrolled in courses beginning on March 21, 2018, in the order that the above information is received.**

The APEA Program will contact you if any courses that you requested are filled.

*The university reserves the right to change or cancel class times and/or course offerings without notice.*