2015 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 instituting this policy in 2015 because we have 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, 412-268-7333) or Senior Academic Advisor Veronica Peet (vpeet@andrew.cmu.edu, 412-268-3750).

Newly listed courses for the APEA Program in 2015 include:

76-266  Creative Non-Fiction: The Love Story
79-249  20th Century U.S. History
79-274  19th and 20th Century Russia: Society, Art, Music, and Theater
80-110  Nature of Mathematical Reasoning
82-208  Topics in European Studies: European Culture Between and After Two Great Wars of the 20th Century

Visit http://admission.enrollment.cmu.edu/pages/pre-college-apea 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, return your course request form with your deposit and the rest of your Pre-College enrollment forms. Courses fill in the order that deposits and forms are received by the university.

To view your course schedule, visit Student Information Online on the HUB’s website (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 (June 30, 2015) 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.

The first version of this course listing expressed uncertainty about whether we would offer our usual Computer Science courses. This updated course listing indicates all of the APEA Computer Science courses now planned for the summer of 2015: 15-110, 15-112, and 15-122. These are the same courses as in previous summers.

This course list is accurate as of April 30, 2015 (ver B).
<table>
<thead>
<tr>
<th>Units</th>
<th>Course Title</th>
<th>MTWRF (unless indicated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>03-121E Modern Biology</td>
<td>9:00a-10:20a</td>
</tr>
<tr>
<td>9</td>
<td>03-124E Modern Biology Lab</td>
<td>MW 12:00n-2:50p</td>
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<tr>
<td>3</td>
<td>09-101E Introduction to Experimental Chemistry</td>
<td>M 1:30p-2:20p and W 1:30p-4:20p</td>
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<tr>
<td>10</td>
<td>09-105E Introduction to Modern Chemistry I</td>
<td>10:30a-11:50a</td>
</tr>
<tr>
<td>10</td>
<td>15-110E Principles of Computing</td>
<td>9:00a-10:20a and 4:30p-5:30p</td>
</tr>
<tr>
<td>12</td>
<td>15-112E Fundamentals of Programming &amp; Computer Science</td>
<td>9:00a-10:20a and 4:30p-5:30p</td>
</tr>
<tr>
<td>10</td>
<td>15-122E Principles of Imperative Computation</td>
<td>10:30a-11:50a and 3:00p-4:20p</td>
</tr>
<tr>
<td>12</td>
<td>18-100E Introduction to Electrical and Computer Engineering</td>
<td>10:30a-11:50a, MWF 3:00p-4:20p, and TR 1:30p-4:20p</td>
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<tr>
<td>10</td>
<td>21-120E Differential and Integral Calculus</td>
<td>9:00a-10:20a</td>
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<tr>
<td>10</td>
<td>21-120F Differential and Integral Calculus</td>
<td>10:30a-11:50a</td>
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<tr>
<td>10</td>
<td>21-122E Integration and Approximation</td>
<td>10:30a-11:50a</td>
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<tr>
<td>9</td>
<td>21-127E Concepts of Mathematics</td>
<td>9:00a-10:20a</td>
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<tr>
<td>9</td>
<td>21-259E Calculus in Three Dimensions</td>
<td>9:00a-10:20a</td>
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<tr>
<td>9</td>
<td>21-260E Differential Equations</td>
<td>9:00a-10:20a</td>
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<tr>
<td>9</td>
<td>27-052E Introduction to Nanoscience and Technology</td>
<td>MWF 1:00p-2:50p</td>
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<tr>
<td>12</td>
<td>33-106E Physics for Engineering Students I</td>
<td>12:30p-2:50p</td>
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<tr>
<td>12</td>
<td>33-107E Physics for Engineering Students II</td>
<td>9:30a-11:50a</td>
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<tr>
<td>9</td>
<td>33-115E Physics for Future Presidents</td>
<td>3:00p-4:20p</td>
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<tr>
<td>9</td>
<td>33-124E Introduction to Astronomy</td>
<td>1:30p-2:50p</td>
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<tr>
<td>9</td>
<td>36-201E Statistical Reasoning and Practice</td>
<td>10:30a-11:50a</td>
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<tr>
<td>9</td>
<td>51-260E Design Fundamentals</td>
<td>1:30p-3:20p</td>
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<tr>
<td>9</td>
<td>57-341E Sound Recording Workshop</td>
<td>MWF 1:30p-2:50p and MW 6:30p-9:20p</td>
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<tr>
<td>9</td>
<td>62-330E Filmothea: Seminar in Film Music</td>
<td>MW 1:30p-4:20p</td>
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<tr>
<td>9</td>
<td>70-122E Introduction to Accounting</td>
<td>9:00a-10:20a</td>
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<tr>
<td>9</td>
<td>73-100E Principles of Economics</td>
<td>1:30p-2:50p</td>
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<tr>
<td>9</td>
<td>76-101E Interpretation and Argument: Meanings of Subcultures</td>
<td>3:00p-4:20p</td>
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<tr>
<td>9</td>
<td>76-101F Interpretation and Argument: Shakespeare Sampler</td>
<td>10:30a-11:50a</td>
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<tr>
<td>9</td>
<td>76-266E Creative Nonfiction (Love Story)</td>
<td>9:00a-10:20a</td>
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<tr>
<td>9</td>
<td>79-104E Global Histories: East Asia 1600-Present</td>
<td>12:00n-1:20p</td>
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<tr>
<td>9</td>
<td>79-249E 20th Century US History</td>
<td>MW 3:00p-5:20p</td>
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<tr>
<td>9</td>
<td>79-274E 19th and 20th Century Russia</td>
<td>10:30a-11:50a</td>
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<tr>
<td>9</td>
<td>80-100E Introduction to Philosophy</td>
<td>12:00n-1:20p</td>
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<tr>
<td>9</td>
<td>80-110E Nature of Mathematical Reasoning</td>
<td>3:00p-4:20p</td>
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<tr>
<td>9</td>
<td>80-130E Introduction to Ethics</td>
<td>1:30p-2:50p</td>
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<tr>
<td>9</td>
<td>80-205E Introduction to Rational Choice</td>
<td>1:30p-2:50p</td>
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<tr>
<td>9</td>
<td>80-212E Arguments and Logical Analysis</td>
<td>10:30a-11:50a</td>
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<tr>
<td>9</td>
<td>80-220E Philosophy of Science</td>
<td>1:30p-2:50p</td>
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<tr>
<td>12</td>
<td>82-101E Elementary French I</td>
<td>10:30a-11:50a</td>
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<tr>
<td>12</td>
<td>82-131E Elementary Chinese I</td>
<td>10:30a-11:50a</td>
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<tr>
<td>12</td>
<td>82-141E Elementary Spanish I</td>
<td>9:00a-10:20a</td>
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<tr>
<td>12</td>
<td>82-171E Elementary Japanese I</td>
<td>9:00a-10:20a</td>
</tr>
<tr>
<td>12</td>
<td>82-191E Elementary Russian I</td>
<td>9:00a-10:20a or TBA</td>
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<tr>
<td>9</td>
<td>82-205 European Culture Between and After Two Great Wars</td>
<td>12:00n-1:20p</td>
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<tr>
<td>9</td>
<td>85-102E Introduction to Psychology</td>
<td>12:00n-1:20p</td>
</tr>
<tr>
<td>9</td>
<td>85-241E Social Psychology</td>
<td>1:30p-2:50p</td>
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</tbody>
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Beyond these beginning courses in French, Chinese, Spanish, and Japanese, a large number of Elementary, Intermediate, and Advanced courses are available in those three languages as well as in Arabic and Italian.
03-121 Modern Biology (9 units)
This is an introductory course with no lab component 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 at Carnegie Mellon. 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. 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.

09-101 Introduction to Experimental Chemistry (3 units)
This course gives students hands-on experience with laboratory methods and techniques. Experiments include the synthesis and characterization of organic compounds (aspirin and “oil of wintergreen”); a kinetics experiment that involves the determination of the rate law of a chemical reaction; a thermochemistry experiment that investigates the products of a transition metal complexation reaction; and various studies involving iron properties and content. The course is offered at no additional tuition charge to students enrolled in APEA. There is a $45 lab fee for materials and supplies. 50-minute weekly lecture and 3-hour weekly laboratory. When you enroll in 09-105 (Introduction to Modern Chemistry I) as an APEA student, by default you will also be enrolled in 09-101 (Introduction to Experimental Chemistry) unless that conflicts with another course you have selected.

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 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. This is an introductory chemistry course for students interested in engineering, science and other related disciplines at Carnegie Mellon. 80-minute daily lecture. When you enroll in 09-105 (Introduction to Modern Chemistry I) as an APEA student, by default you will also be enrolled in 09-101 (Introduction to Experimental Chemistry) unless that conflicts with another course you have selected.

15-110 Principles of Computing (10 units)
This is 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 80-minute daily recitation.

15-112 Fundamentals of Programming and Computer Science (12 units)
This is 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 gentler introduction to computer science should consider first taking 15-110. 80-minute daily lecture and 80-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 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. If they are both offered, we will attempt to schedule them at the same time in order to permit students to transfer between them during the first two days of the summer session; nevertheless; exercise your own best judgment about which course is more suitable before you arrive.

15-122 Principles of Imperative Computation (10 units)
This course is for students with a basic understanding of programming (variables, expressions, loops, arrays, functions). It 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. Prerequisites: 15-112 or equivalent (such as 4 or 5 on the AP Computer Science exam). Students uncertain of their background are strongly advised contact Dr. Alba and arrange to complete the School of Computer Science placement exam before enrolling in 15-122. All students enrolled in 15-122 must also have completed 21-127 (Concepts of Mathematics) previously, or be co-enrolled this summer in 21-127. 80-minute daily lecture and 80-minute daily recitation.

18-100 Introduction to Electrical and Computer Engineering (12 units)
This course introduces the basic concepts of electrical and computer engineering through theoretical concepts in lectures, project work in the lab, and problem-solving exercises. We will analyze, construct and test circuits that are the basis for an audio amplifier, and analaog to digital and back to analog systems using a microprocessor. Specific topics that will be covered include system decomposition, real and ideal sources, Kirchoff’s and Ohm’s Laws, linear and nonlinear circuit elements, ideal op-amp characteristics and circuits, energy storage elements and their operation in both the time- and frequency-domains, basic signal processing including modulation and sampling, combinational logic, Karnaugh Maps, sequential logic and Flip-Flops, and the basics of microprocessors. 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)
This course includes but is not limited to the study of 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 and applications of integration. Prerequisite: high school pre-calculus course with trigonometry, exponential functions and logarithmic functions. Contact the APEA Director 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 the higher-level 21-122. 80-minute daily lecture.
21-122 Integration, Differential Equations and Approximation (10 units)
This course includes but is not limited to the study of integration by trigonometric substitution and partial fractions, arc length, improper integrals, Simpson’s and Trapezoidal Rules for numerical integration, Newton’s method, Taylor’s Theorem including a discussion of the remainder, sequences, series, power series. This is the second main calculus course at Carnegie Mellon. Students who have successfully completed AP Calculus BC or an equivalent course should enroll in a higher-level math course, such as 21-259. 80-minute daily lecture.

21-127 Concepts of Mathematics (9 units)
This is a rigorous course and should be taken only by students with a very serious interest in abstract or discrete mathematics. This course includes an introduction to the algebra of sets, relations, functions and partitions and a basic introduction to elementary number theory. The techniques of proof introduced include proof by induction, proof by specialization and division into cases, indirect proof, existence and uniqueness proofs and nonconstructive methods. Approval of the instructor or the Mathematical Sciences Department may be required. This course is rewarding but challenging, even for students who have already taken difficult high school math courses. 80-minute daily lecture.

21-259 Calculus in Three Dimensions (9 units)
Vectors, lines, planes, quadratic surfaces, polar, cylindrical and spherical coordinates, partial derivatives, directional derivatives, gradient, divergence, curl, chain rule, maximum-minimum problems, multiple integrals, parametric surfaces and curves, line integrals, surface integrals, Green-Gauss theorems. Prerequisite: 21-120 and 21-122 or equivalent coursework. This course is the third main calculus course at Carnegie Mellon. 80-minute daily lecture.

21-260 Differential Equations (9 units)

27-052 Introduction to Nanoscience and Technology (9 units)
This course introduces the fundamental properties of materials with characteristic length scales in the nanometer (10^-9 meter) range, the principles underlying the synthesis and engineering of nanomaterials as well as elemental entrepreneurial and ethical frameworks to understand the socio-economic impact of nanotechnologies. The various aspects related to field of nanotechnology will be reviewed to provide the context for the subsequent discussion of the fundamental physical concepts related to nanomaterials, the bottom-up and top-down engineering of nanostructures, the characterization of nanomaterials as well as applications of nanotechnologies. Case studies will introduce students to the opportunities and challenges of nanotechnologies. The course is primarily designed for students with interest in pursuing science or engineering studies but also intended to provide students outside the science and engineering domain an understanding of the fundamental concepts that are underlying the emerging field of nanotechnology. 110-minute meetings three times per week.

33-106 Physics for Engineering Students I [Mechanics] (12 units)
This course covers basic principles of mechanics and thermodynamics; vectors, displacement, velocity, accelerations, force, equilibrium, mass, Newton’s law, gravitation, work, energy, momentum, impulse, temperature, heat, equations of state, thermodynamic process, heat engines, refrigerators, first and second laws of thermodynamics and kinetic theory of gases. Taking Calculus concurrently is strongly advised. This course is required of all engineering students at Carnegie Mellon. 70-minute daily lecture and 70-minute daily recitation.
33-107 Physics for Engineering Students II [Electricity and Magnetism] (12 units)
This course is the second part of a two-semester freshman calculus-based introductory physics sequence for engineering students. The course covers waves, including standing and traveling waves, superposition, beats, reflection, interference, electricity, including electrostatics and electric fields, Gauss’ law, electric potential, simple circuits and magnetism, including magnetic forces, magnetic fields, induction and electromagnetic radiation. Prerequisites: high school calculus course or concurrent enrollment in 21-120. Completion of a physics course in mechanics or equivalent course in high school (5 in AP Physics C: Mechanics) is required. 70-minute daily lecture and 70-minute daily recitation.

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. 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.

36-201 Statistical Reasoning and Practice (9 units)
Numerical data surrounds us – from baseball box scores to the gross national product; from crime statistics to demographic trends. Statistical methodology and practice allows us to quantify data in order to draw conclusions. The course will introduce basic concepts involved in statistical reasoning. The major topics include methods for exploratory data analysis, research methods and methods for statistical inference. The course will include the use of the computer to facilitate the understanding of important statistical ideas and for the implementation of data analysis. In addition to lectures, students will attend computer labs each week. 80-minute daily lecture.

51-260 Design Fundamentals (9 units)
Designers help create the artifacts of our everyday experiences – from software applications, to magazines and books, to automobiles, to toothbrushes. Over six weeks, experienced design faculty and design practitioners will take you through core experiences in the communications and product design processes. These experiences will include design research, conceptualization, three-dimensional design, working with images and text, and the presentation of your design work. Students will need a digital camera and may be asked to purchase up to $100 in materials to support class work. 110-minute daily sessions.

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.
62-330 Filmothea: Seminar in Film Music (9 units)
The first 100 years of the 20th Century’s only original art form, whose advent has brought about tremendous social and cultural changes. Students view selected films, learning first the basics of film theory, cinema’s working structures and the function of music soundtrack. Ultimately, they are able to analyze in written essays and class discussions, the function and value of the music in a particular film and the cultural impact such music has had on society. The work of the course involves attendance at screenings and active participation in the following analytical discussions. Students are expected to present two written reports on films/readings and sustain a final oral presentation. 3-hour meeting 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 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.

73-100 Principles of Economics (9 units)
Literally, an introduction to economic principles, the goal of this course is to give students an understanding as to what constitutes good “economic thinking”. This thought process is grounded in the construction and use of economics models. Drawing on issues in both microeconomics and macroeconomics, fundamental principles are shown to transcend particular examples and allow the field to be seen as a coherent, unified whole. 80-minute daily session.

76-101 Interpretation and Argument (9 units)
This course is structured to introduce students to fundamental practices of critical reading and academic argument. Students are exposed to a variety of different texts, both fiction and nonfiction, so that they can explore and critically evaluate a single issue from multiple perspectives. They are taught to summarize and analyze arguments within that issue so that they may contribute an argument of their own. It is also geared toward helping students understand the requirements of college-level argumentation and composition. Becoming a competent writer in this way requires that students be reflective and strategic with their composing processes, particularly with planning, writing, reading, detecting and diagnosing problems within their own work, and finally with revising their own texts. Finally, the course provides opportunities for students to develop critical thinking skills for analyzing and producing texts within the context of an academic community. This course is required of all degree students at Carnegie Mellon. 80-minute daily session.

Section E – The Meanings of Subcultures

Only three years after bands like the Sex Pistols and the Clash initiated a new social movement known as “punk rock,” the British group Crass had already declared that “Punk [was] Dead” by comparing it to other new consumer trends that were popular at the time. Since the emergence of punk, it has been considered just one example of a subculture that claims to “resist” mainstream culture. This course will use punk and other music-based subcultures as an interpretive lens to discuss the dynamic relationship between mainstream or “mass” culture and alternative or resistant subcultures. For example, what makes something mainstream, and why or how would a subculture wish to resist the mainstream? For that matter, can one even speak of a mainstream culture?

This course will draw from the field of Cultural Studies to define and elaborate concepts of mass culture and subcultures. We will explore the history, influence, and controversies of various subcultures through texts that analyze the political nature of subcultures (e.g., Dick Hebdige’s Subculture: The Meaning of Style) and films which document how individuals participate in subcultures (e.g., Afro-Punk). Using methods of critical reading and academic writing, students will engage responsibly with the controversial topic of resistance in
subcultures. Students will analyze arguments as part of an overall conversation of subcultural practices, synthesize perspectives on central issues within that topic, and finally contribute their own arguments to the discussion of the meanings of subculture.

Section F – Shakespeare Sampler

In the preface to a 1725 edition of Shakespeare’s works, Alexander Pope wrote: “It is not my design to enter into a Criticism upon this Author; tho’ . . . of all English Poets Shakespeare must be confessed to be the fairest and fullest subject for Criticism...” Indeed, Shakespeare has been the subject of literary criticism for centuries. As a vehicle for developing critical reading and writing skills, this section of 76-101 focuses on the literary and cultural criticism that has circulated around Shakespeare and one of his works. We will enter into the ongoing conversation with and about one of Shakespeare’s plays and, in the process, discover the various arguments that have been made about (1) Shakespeare and his preservation in the canon; and (2) the aesthetic, literary, and cultural interpretations of the play we read. At the close of the course, students will be able to summarize an argument about Shakespeare and his works, synthesize the major theoretical debates in literary and cultural criticism of a play, and present an argument of their own.

76-266 Creative Non-Fiction: The Love Story (9 units)

Whether famous (or infamous) or secret, fantastical or every-day, gone-wrong or happily-ever-after, writing about love is as universal as it is deeply particular, and the subject provides a powerful engine for our creative work as writers. This course encourages students to take up the many-sided subject of love in all three major genres (poetry, fiction, and nonfiction), beginning with considering how we might define “love” in its many nuanced facets as writers, and then shaping that important definition through the reading of other contemporary writers’ diverse work on the subject. This course will offer readings in short fiction, poetry, and creative nonfiction about love in its numerous and distinct contexts, considering both common tropes within the subject and ways that writers subvert or challenge those tropes. What does it mean to write about love, and how can we push to do so in new and challenging ways? Students will then have the opportunity to craft, workshop, and revise their own creative work, using these complex definitions of “the love story” to help direct their own creative poetry or prose writing.

79-104 Global Histories (9 units)

This course offers you several options for expanding on the skills you need to think globally through the medium of history. As their descriptions indicate, the differently titled lectures vary in their subject matter and the particular pathways they provide for exploring global processes. However, they all involve a mix of lectures and recitations; they have similar amounts of reading; and they all use essay-writing as the primary medium of assessment. Most importantly, they all strive to help you: (1) identify and assess the varied ways that scholars interpret global interactions as they unfold through time; (2) bring together insights from diverse fields in the humanities and social sciences to illuminate the development of global connections, differences, and divisions; (3) read, listen, discuss, take notes, and craft written arguments supported by different kinds of evidence; and, above all, (4) use explorations in global histories to engage the workings of the world today and in the future. 80-minute daily session.

Section E – East Asia in the World, 1600-Present

The aim of the course is to provide a broad understanding of the place of East Asia in the world, and of the challenges that each state (China, Japan, Korea) has faced at home and abroad since 1600. Together we will examine the different ways the three states responded to internal and external crises and transformed into modern nationhood. We will also consider interpretations of the past that continue to impact how East Asians today perceive themselves, their countries, and international relations. Some of the topics covered will include globalization, imperialism, nationalism, gender politics, and the role of historical memory (as in Nanking, Hiroshima and the Korean War). Historical sources will include primary and secondary documents, pictures, films and memoirs.
20th Century U.S. History (9 units)
During the 20th Century, the United States established unprecedented economic, military, and political influence in the international sphere. American society itself, however, was often deeply divided by competing political ideologies, economic injustice and the denial of civil rights. This course examines the gradual expansion of economic, political, and civil rights for workers, women, African-Americans, and the GLBT community, as well as the periodic limitations placed on that expansion. It will analyze how Americans in the 20th Century balanced concepts of freedom with strategies for economic security, how the dueling political ideologies of conservatism and liberalism impacted ordinary Americans, and how social movements variously demanded both economic and civil liberties. Topics include the limitations of the Progressive Era, the shock of the Great Depression, the home front during World War II, the impact of the Cold War on domestic life, the Civil Rights movement(s), and the rising influence of the New Right. Readings highlight the evolving relationship between the state, corporate America, and the ordinary citizen. 80-minute daily session.

19th and 20th Century Russia: Society, Art, Music and Theater (9 units)
This course will focus on the most significant historical events in 19th and 20th century Russian societies, and track their influence on the development of Imperial, Soviet and post-Soviet culture and cultural institutions. Students will learn about famous giants of Russian literature, painting, music, and drama who gained global recognition. The course, which includes secondary readings, primary documents, and films, will allow students to achieve a critical understanding of contemporary Russia. 80-minute daily session.

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 arising 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, homework 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 strengths, whether such weaknesses can be resolved and, if they cannot be resolved, why. 80-minute daily session.

Nature of Mathematical Reasoning (9 units)
This course focuses on understanding the principles and problems at the root of mathematical reasoning; it is not a course on any specific mathematical theory, like linear algebra or topology. We will explore the foundations of mathematics, both in terms of their historical origin and their modern purpose as a base for the study of mathematics. Then we will see how problems which seem to have no intuitive solution look simple after being put in the right mathematical form, but also consider the limitations this type of approach. We will treat such issues as they arise both in applied fields (policy decision-making, physics, computer science) and as more recreational, speculative and abstract (Conway’s game of life, the works of Escher, music). The course is aimed for students at the freshman and sophomore level who do not necessarily intend to pursue a mathematically intense major. 80-minute daily session.

Introduction to Ethics (9 units)
As human beings, we frequently grapple with difficult moral questions. How ought I treat my friends and peers? What kinds of policies should a government adopt? When, if ever, can we justify harm? These are the kinds of questions we will consider as we survey the most prominent, contemporary ethical theories. Along the way, we will consider the implications of those theories for real world ethical issues, including capital punishment, pornography, and universalized healthcare. 80-minute daily session.
80-205 Introduction to Rational Choice (9 units)
This course is an introduction to rational choice theory, which is concerned with normative and descriptive accounts of individual and group decision making. This course will cover a variety of topics in decision theory, game theory, and social choice theory. Among other things, it will survey the main normative theories of decision making (von Neumann-Morgenstern theory, Anscombe-Aumann’s theory, and Savage’s theory) and the main descriptive theories of decision making found in psychology and economics. Possible topics include, but are not limited to, the following: non-expected utility, game theoretic problems of conflict and coordination, the role of heuristics in choice behavior and strategic reasoning, probabilistic forecasting, theories which abandon the Bayesian assumption that degrees of belief are precise, voting theory, group decision making, and Arrow’s Theorem. This course will emphasize the role that formal methods play in the analysis of decisions, with an eye toward alternative applications of decision theory to issues in philosophy and social science. 80-minute daily session.

80-212 Arguments and Logical Analysis (9 units)
Are there rational methods that can further our knowledge? The notion of rational inquiry presupposes that there are appropriate methods for the pursuit of knowledge. In this course, we will investigate the means by which a successful argument justifies its conclusion, as well as various subtle ways in which other arguments fail. In the course of our inquiry, we will take a historically informed approach to studying logic and argumentative fallacies. We will also discover that these tools are useful for constructing and analyzing arguments in all disciplines from philosophy and history to psychology and physics. Our primary goal is to learn to use these tools to make our thinking and writing clearer, more precise, and more critical. To that end, our coursework will consist in homework and exams on topics in logic, as well as essays on a wide variety of topics. This course is intended for students from any discipline who would like to improve their writing and critical thinking skills. 80-minute daily session.

80-220 Philosophy of Science (9 units)
In this course, we will examine some historical case studies (e.g., the Copernican revolution in astronomy) against which we will assess views pertaining to the significance, justification, and production of scientific knowledge. For example, should scientific theories be understood literally or as computational devices for deriving new predictions? How can universal conclusions ever be justified by a finite data set? Does explanation contribute to a theory’s confirmation by the evidence? Does science aim to find the truth? Is probability in the world or only in our minds? Is explanation a matter of finding causes or are causes whatever it is that explains? Is scientific rationality objective or culture-relative? 80-minute daily session.

The following language courses have no prerequisite. 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) or Dr. William Alba (alba@cmu.edu).

82-101 Elementary French I (12 units)
This course is for students who have never studied French. The emphasis is on all four skills (listening, speaking, reading, and writing) and on cultural information as it is presented in the text and through homework assignments. Regular participation in class is mandatory (four in-class hours per week). In addition, this course requires that students spend time using different multimedia tools (audio CD, video, CD-ROM, ML server, Internet) to complete assignments. Information on how to use these tools will be provided. The elementary level is designed to help students learn to reflect upon and draw upon strategies used by good language learners in their second language study. If a student has studied French before, then s/he must take a placement exam. 80-minute daily session.
82-131 Elementary Chinese I (12 units)
This course is for beginners in Mandarin Chinese. Its goal is to train students in the basic skills of listening, speaking, reading and writing for daily communication in Chinese. Students will learn the phonetic transcriptions of Chinese (Pinyin) for speaking and listening as well as Chinese characters for reading and writing. Basic vocabulary and sentence patterns used in everyday life are taught so that students will be able to carry on simple conversations on everyday life topics. Students will be introduced to cultural issues through class, extracurricular activities and multimedia programs. The elementary level is designed to help students learn to reflect and draw upon strategies used by good language learners in their second language study. 80-minute daily session.

82-141 Elementary Spanish I (12 units)
A course for beginning students emphasizing the development of communicative language proficiency: oral practice, aural comprehension, reading, writing, structural analysis, and language learning resource center work. It also involves studying cultural aspects of Spanish-speaking countries. If a student has studied Spanish before, then s/he must take a 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 background 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. Furthermore, the elementary-level language course is designed to help students learn to reflect upon and draw upon strategies used by good language learners in their second language study. If a student has studied Japanese before, then s/he must take a placement exam. 80-minute daily session.

The above language courses have no prerequisite. 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) or Dr. William Alba (alba@cmu.edu).

82-191 Elementary Russian I (12 units)
This beginning-level Russian language course takes a proficiency-based approach to teaching basic skills in listening, speaking, reading and writing. Language is presented in communicative contexts illustrating cultural aspects of daily Russian life. Special emphasis is given to developing oral competency. One or two hours per day outside of class must be devoted to practicing language skills. 80-minute daily session to be arranged with instructor.

82-208 Topics in European Studies: European Culture Between and After Two Great Wars of the 20th Century (9 units)
How did World War I and World War II change European society and culture? Defining the meaning of “Europe” or “European” is complicated, since it refers to both a geographical location and a shared history and cultural identity. Based on interdisciplinary approach to the multiple regions and countries located on a single continent, the course will equip students with the skills, methods, and concepts essential for a better understanding of European culture, society and thought, ranging across tragic events of European history such as World War I and World War II, the rise and fall of Nazi and Communist regimes and ideologies and will focus on the most important cultural developments and achievements of Europe in the 20th and 21st centuries. Students will learn how to present material effectively, to analyze texts critically, and to construct coherent arguments. 80-minute daily session.

85-102 Introduction to Psychology (9 units)
Examines major areas of scientific psychology. 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, cognitive and perceptual information processing, problem solving, obedience and conformity, emotion, how our social, cognitive and language functions develop, the importance of childhood to adult functioning and psych-pathology. Includes a small number of computerized laboratory experiments and experiences in which the student will perform experiments and analyze real data. 80-minute daily session.
**85-241 Social Psychology** (9 units)
The focus of this course will be on how people’s behaviors, 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. NOTE: Students without a prior course in Psychology should take the previous course, 85-102 (Introduction to Psychology). 80-minute daily session.

For the most recent updates to this course list and schedule, see [www.cmu.edu/enrollment/pre-college/apea.html](http://www.cmu.edu/enrollment/pre-college/apea.html)
This course list is accurate as of April 30, 2015 (ver B). The following updates have been made since February 19:

**New courses added:**
- 82-208 Topics in European Studies: European Culture Between and After Two Great Wars of the 20th Century
- 15-110 Principles of Computing
- 70-122 Introduction to Accounting
- 82-191 Elementary Russian I
- 80-130 Introduction to Ethics

**Course dropped:**
- 80-135 Introduction to Political Philosophy

**Course time change:**
- 76-101F Interpretation and Argument – Shakespeare Sampler moved from 1:30p-2:50p to 10:30a-11:50a

*The first version of this course listing expressed uncertainty about whether we would offer our usual Computer Science courses. This updated course listing indicates all of the APEA Computer Science courses now planned for the summer of 2015: 15-110, 15-112, and 15-122. These are the same courses as in previous summers.*

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

or

Ms. Veronica Peet, APEA Senior Advisor
Email: [vpeet@andrew.cmu.edu](mailto:vpeet@andrew.cmu.edu)
Phone: 412-268-3750 (campus extension 8-3750)
Office: Doherty Hall 1324

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

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