

2008 APEA Course Offerings

Courses meet daily unless otherwise noted. Full courses at Carnegie Mellon carry 9 to 12 units, corresponding at other U.S. colleges and universities to 3 to 4 credits. Students who reside in university housing must be enrolled in two full courses. Students who wish to enroll in more than 25 units must first consult with the APEA Program Director, Dr. William Alba (alba@cmu.edu, 412-268-7333).

Newly listed courses for the APEA Program in 2008 include

- Experimental Physics
- Interpretation and Argument – Curiouser and Curiouser!
- Interpretation and Argument – One Man = Total War: Globalization, Violence and Terrorism
- The Slasher Film: Gender, Genre, and Horror Films
- Topics in Rhetoric: Argument
- Cognitive Psychology
- Introduction to Nanoscience and Nanotechnology

Visit <http://www.cmu.edu/enrollment/pre-college/apea.html> for up-to-date course availability and class times. Additional courses, such as in Modern Languages, 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 2 courses, contact Enrollment Services - The HUB at 412-268-8186.

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 about course choices, **return your course request form with your deposit and the rest of your Pre-College enrollment forms.** Courses will fill in the order that forms are received by the university.

To view your course schedule, visit Student Information Online on the HUB 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 (July 1, 2008) by contacting the APEA Director before arrival or by meeting the APEA Director once the program begins. Students and their families are responsible for communicating to each other any changes in their academic plans.

Units	Number	Course Title	MTWRF Unless Indicated
9	03-121	Modern Biology	9-10:20 a.m.
3	09-101	Introduction to Experimental Chemistry	M 3-3:50 p.m., W 3-5:50 p.m.
10	09-105	Introduction to Modern Chemistry I	10:30-11:50 a.m.
10	09-106	Modern Chemistry II	1:30-2:50 p.m.
9	12-052	Special Topics: Concepts and Principles in Civil and Environmental Engineering	MWF Noon-1:20, TR Noon-2:50 p.m.
10	15-100	Introductory/Intermediate Programming	9-10:20 a.m., 4:30-5:50 p.m.
9	15-111	Intermediate/Advanced Programming	9-10:20 a.m., 4:30-5:50 p.m.
12	15-211	Fundamental Data Structures and Algorithms	10:30-11:50 a.m., 4:30-5:50 p.m.
12	16-221	Robots to the Rescue: A Gentle Introduction to Mobile Robotics	TR 6:30-7:20 p.m., +8h independent lab
12	18-100	Introduction to Electrical and Computer Engineering	10:30-11:50 a.m., TR 1:30-4:20 p.m.
10	21-120E	Differential and Integral Calculus	9-10:20 a.m.
10	21-120F	Differential and Integral Calculus	10:30-11:50 a.m.
10	21-122	Integration, Differential Equations, and Approximation	10:30-11:50 a.m.
9	21-127	Concepts of Mathematics	9-10:20 a.m.
9	21-259	Calculus in Three Dimensions	9-10:20 a.m.
9	21-260	Differential Equations	9-10:20 a.m.
9	33-104	Experimental Physics	9:30 a.m.-12:20 p.m.
12	33-106	Physics for Engineering Students I	1:30-2:50 p.m.
12	33-107	Physics for Engineering Students II	10:30-11:50 a.m.
9	36-201	Statistical Reasoning and Practice	10:30-11:50 a.m.
9	36-202	Statistical Methods	10:30-11:50 a.m.
9	57-337	Sound Recording	MWF 1:30-2:50 p.m., MW 6:30-9:30 p.m.
9	73-100	Principles of Economics	1:30-2:50 p.m.
9	76-101E	Interpretation and Argument -- Curiouser and Curiouser!	10:30-11:50 a.m.
9	76-101F	Interpretation and Argument -- One Man=Total War: Globalization, Violence and Terrorism	Noon-1:20 p.m.
9	76-213	20th Century Literary and Cultural Studies: The Slasher Film	TR 6:30-9:50 p.m.
9	76-373	Topics in Rhetoric: Argument	MW 6:30-9:50 p.m.
9	79-104	Introduction to World History	Noon-1:20 p.m.
9	79-274	War and Society in Revolutionary Europe, 1780-1815	10:30-11:50 a.m.
9	79-281	Russian History: From Communism to Capitalism	3-4:20 p.m.
9	80-100	What Philosophy Is	Noon- 1:20 p.m.
9	80-130	Introduction to Ethics	10:30-11:50 a.m.
9	80-180	The Nature of Language	1:30-2:50 p.m.
9	80-210	Logic and Proofs	TR 9-10:20 a.m.
9	80-212	Arguments and Logical Analysis	3-4:20 p.m.
12	82-191	Elementary Russian I	TBA
9	85-102	Introduction to Psychology	Noon-1:20 p.m.
9	85-211	Cognitive Psychology	Noon-1:20 p.m.
9	88-314	Politics through Film	MW 6:30-9:50 p.m.
		Introduction to Nanoscience and Nanotechnology	TBA

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.

09-101 Introduction to Experimental Chemistry (3 units)

An optional laboratory 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. This course is offered at no additional tuition charge to students enrolled in 09-105 or 09-106. There is a \$45 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 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.

09-106 Modern Chemistry II (10 units)

The course provides an introduction to some basic concepts of chemical equilibria and thermodynamics. Topics may include gas phase equilibria, acid-base chemistry, solubilities, oxidation-reduction reactions, enthalpy, entropy, free energy, colligative properties and electrochemistry. Chemical kinetics is introduced to complement the study of thermodynamics. 09-105 and 09-106 together constitute the first-year chemistry sequence for science students at the university. 09-105 is the usual prerequisite for this course; only those APEA students with sufficient preparation may enroll in 09-106. Consult with the Program Director if you have questions. 80-minute daily lecture.

12-052 Special Topics: Concepts and Principles in Civil and Environmental Engineering (9 units)

An introduction to basic concepts and principles in civil and environmental engineering as a means of presenting an overview of the profession. Subfield disciplines specifically highlighted may include: structural analysis; computer-aided design, modeling and monitoring; project management of traditional and sustainable construction projects; and environmental remediation, pollution prevention and green design. Students will complete problem-solving exercises, including short-term homework assignments and longer-term projects, which apply fundamental concepts from these subfields and demonstrate the integration of engineering skills (e.g., research, analysis, and evaluation) with professional skills (e.g., effective written and oral presentation). This is a special topics course. Students will receive 9 units of elective credit at Carnegie Mellon should they later enroll in the civil and environmental engineering department as degree students. 80-minute lecture three times per week; 3-hour recitation two times per week.

15-100 Introductory/Intermediate Programming (10 units)

An introduction to the process of program design and analysis using Java programming language for students who have no prior programming experience. Topics include basic data types and their operators, I/O, control structures (selection, loops), classes (including methods and fields), files, arrays and simple sorting and searching algorithms. APEA students who have successfully taken a programming course before and have used functions, loops and arrays

should enroll in 15-111 instead of 15-100. Prerequisite: minimum PSAT Math = 65 or SAT Math = 650. 80-minute daily lab and 80-minute daily lecture.

15-111 Intermediate/Advanced Programming (9 units)

This course assumes prior programming experience (the equivalent of a one-semester college course) and is designed to expand students' knowledge of computer science and sharpen their programming skills through the implementation of a large project. The course extends object-oriented programming techniques begun in previous course work and covers data aggregates, data structures (e.g., linked lists, stacks, queues, trees and graphs), and an introduction to the analysis of algorithms that operate on those data structures. The course is taught in Java and, along with 21-127, serves as a prerequisite for 15-211. Prerequisite: minimum PSAT Math = 65 or SAT Math = 650, plus previous programming experience equivalent to 15-100 (see course description for 15-100). Experience in the Java programming language is preferred, but not mandatory. An assessment will be administered at the beginning of the course to determine if the student has the appropriate background. [Note: this course replaces 15-200, which is no longer offered by the university.] 80-minute daily lecture and 80-minute daily recitation.

15-211 Fundamental Data Structures and Algorithms (12 units)

Fundamental programming concepts are presented together with supporting theoretical foundations and practical applications. This course emphasizes the practical application of techniques for writing and analyzing programs: data abstraction, program verification and performance analysis. These techniques are applied in the design and analysis of fundamental algorithms and data structures. The course is currently taught in Java. Prerequisites: minimum PSAT Math = 65 or SAT Math = 650, plus previous programming experience equivalent to 15-111 (see course description for 15-111), such as a score of 5 on the Computer Science AB AP exam. Students taking this course must also co-register in 21-127 Concepts of Mathematics. Experience in the Java programming language is required. An assessment will be administered at the beginning of the course to determine if the student has the

appropriate background. 80-minute daily lecture and 80-minute daily recitation.

16-221 Robots to the Rescue: A Gentle Introduction to Mobile Robotics (12 units)

This course is designed to teach the basic tools and techniques of engineering and programming a mobile robot. This course is primarily intended for entry-level undergraduates and graduate students though an engineering background is not essential. This is a project-based course with emphasis on learning-by-doing, supplemented by lectures, seminars and talks. Student teams will build an autonomous mobile robot (from kits that will be provided) and use a course-specific easy-to-use programming environment to instruct the robot to perform increasingly sophisticated behaviors requiring vision, motor control and path planning. Besides providing an introduction to integrated system design issues of mobile robots, the students also learn key concepts of mechanics, electronics, control and programming. Students will be tasked to use the system to develop an application related to Rescue Robotics. Final grade is based in part on participation and contribution within the team and in part on the performance in a competitive final project. Engineering background is not essential; programming experience is desirable. 50-minute daily lecture and 3-hour daily laboratory, plus 6 additional hours weekly in small groups.

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

This course introduces the basic concepts of electrical and computer engineering through project work and problem-solving exercises. We will analyze, construct and test an electromechanical system (e.g. a robot) that incorporates concepts within electrical and computer engineering. Specific topics that will be covered include system decomposition, real and ideal sources, Kirchoff's and Ohm's Laws, linear and non-linear circuit elements, ideal op-amp characteristics and circuits, combinations logic, Karnaugh Maps and Flip-Flops. There is also a final project that will provide an opportunity for creative design. Prerequisite: high school technical course such as chemistry or physics. Junior or senior standing in high school required. 80-minute daily lecture, 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; arclength; 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 only be taken 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 or equivalent course work. This course is the third main calculus course at Carnegie Mellon. 80-minute daily lecture.

21-260 Differential Equations (9 units)

Ordinary differential equations: first and second order equations, applications, Laplace transforms; partial differential equations: partial derivatives, separation of variables, Fourier series; systems of ordinary differential equations; applications. Pre-requisite: 21-122 or equivalent course work. 80-minute daily lecture.

33-104 Experimental Physics (9 units)

This course provides first-year students and sophomores with an introduction to the methods of experimental physics. Particular emphasis is placed on three aspects of experimentation: laboratory technique, including both the execution and the documentation of an experiment; data analysis, including the treatment of statistical and systematic errors and computer-aided analysis of experimental data; and written communication of experimental procedures and results. The concepts and skills for measurement and data analysis are acquired gradually through a series of experiments covering a range of topics from mechanics to nuclear and atomic physics. This laboratory course is required of all Carnegie Mellon students majoring in Physics.

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. 80-minute daily lecture.

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 is recommended. 80-minute 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.

36-202 Statistical Methods

This course builds on the principles and methods of statistical reasoning developed in 36-201. The course covers simple and multiple regression and analysis of variance methods. Other topics will be selected from the following: logistic regression, non-parametric methods, probability models. The objective of this course is to develop the skills of applying the basic principles and methods that underlie statistical practice and empirical research. This course will be offered and scheduled according to student interest; contact the APEA Program Director if you are interested in this course. Prerequisite: 36-201 or the equivalent (e.g., score of 5 on the Statistics AP exam). 80-minute daily lecture.

57-337 Sound Recording (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, 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.

73-100 Principles of Economics (9 units)

An introductory course in the development and use of economic tools for analysis of public policy issues. The course begins with an introduction to the central problem of organizing an economy and allocating resources, emphasizing an overview of the market system in a private enterprise economy. Demand and supply analysis and the elements of long-run competitive equilibrium are developed. This is followed by an analysis of the foundations of consumer behavior which determine market supply and demand. The course concludes with an examination of cases in which the competitive paradigm does not hold (monopoly, oligopoly), and a consideration of the problem of multi-market equilibrium in a private enterprise economy. 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. 80-minute daily session. This course is required of all degree students at Carnegie Mellon.

Two sections of Interpretation and Argument are available to APEA students this summer:

76-101E Curiouser and Curiouser!

This section of Interpretation and Argument uses *Alice's Adventures in Wonderland* (1865) and *Through the Looking-Glass* (1872) as a vehicle for developing college-level reading and writing skills. Students will gain experience in close reading fiction, illustration and film as well as reading and understanding components of critical arguments to foster their own critical writing skills. The class will begin with a reading and close discussion of Carroll's stories. We will then spend considerable time reading critical arguments about what Alice means. Students will encounter interpretations of Alice that address children's literature, Victorian conceptions of childhood, the Victorian political climate and Dodgson's personal life. Other essays will address the more whimsical and nightmarish images in the stories: obsessive details about eating and cannibalism, talking animals, beheadings, twisted logic and words without meaning. We will also view several adaptations of the film, including Jan Svankmajer's *Alice*. Students will complete a series of three critical papers standard to the structure of 76-101 as well as some short in-class writing assignments and a presentation.

76-101F One Man = Total War: Globalization, Violence and Terrorism

Terrorism has become a central element in contemporary American politics and international conflict. But pinpointing a definition of terrorism has proven to be elusive. This course will explore the different interests behind competing definitions of terrorism and their political implications. Is terrorism merely a destructive force bent on undermining Western civilization? Is it a politically necessary tactic

or strategy? Is it used only by the powerless to resist domination? Or do powerful states and institutions also use terror for their own purposes? What forms of protest are labeled as "terrorism" and who has the authority to make such distinctions? Is terrorism something deriving from ancient influences? Or a wholly new form of politics?

This writing course will provide students with an entry into contemporary arguments concerning issues of terrorism and power using texts that demonstrate a wide array of disciplinary styles-including cultural analysis, testimonials, interviews, fiction and film. Students will interrogate these texts through a sequence of assignments (argument summary, issue analysis, and contribution) that will allow them to critically examine competing definitions of terrorism.

76-213 20th Century Literary and Cultural Studies: The Slasher Film (9 units)

Moving from the 1950s into the late 1960s, there is a noticeable shift in horror films away from supernatural or atomically created monsters, to films which present a "killer among us" as the primary agent of terror. This course will examine this phenomenon as it helps to constitute the "slasher" subgenre of the horror film. Beginning with films like *Peeping Tom* and Hitchcock's *Psycho*, this course will seek to trace a historical narrative of the slasher film, through its most prolific period (1970's-1980's), culminating with the recent resurgence of the subgenre's popularity in films like *Saw* and *Hostel*, and remakes of slasher classics like *Texas Chainsaw Massacre* and *The Hills Have Eyes*. While easily dismissible as exploitative, "B" movies, recent critics have argued that slasher films like *Friday the Thirteenth* and *Halloween* present subversive critiques of the American mainstream; some even go so far as to say that slasher films have a feminist subtext. Others argue that such films are the paranoid and xenophobic artifacts of neo-conservative America. This course will seek to examine these key debates surrounding these texts, their reemergence in recent years and their effect on American popular culture. This course is open to students of all levels. Knowledge and familiarity with both film theory and horror films is a helpful, but not necessary.

76-373 Topics in Rhetoric: Argument (9 units)

This course is an introduction to the theory and practice of argument. The session begins with an overview of major theories of (and approaches to) argument, along with short assignments to critically assess their value and relevance to the types of argument about which you, the student, are encouraged to investigate. You will choose a type or genre of argument upon which to focus your research. The argument type can be academic, practical, professional and so forth, so long as it is understandable using terms and concepts covered by the course. During the second part of the session we will refine our understanding of argument, and you will develop your own approach to argument analysis. The last third of the session will be devoted to producing an original argument of the type you are researching.

79-104 Introduction to World History (9 units)

Introduction to World History challenges students to think analytically about the major historical processes that shaped and continue to shape cultures and civilizations. The course is based on a series of case studies that focus on shifting power relations between and within civilizations. Three major themes connect the several topics discussed throughout the semester: issues of authority and inequality within civilizations; encounters and conflicts between civilizations; and patterns of continuity and change across space and time. The course demonstrates how historians explain what has happened in the past and in various civilizations and cultures; presents the kinds of evidence that historians use to reconstruct the past; and examines the interpretations historians make based on this evidence. The semester begins with a consideration of the rich culture of medieval Iberia and then moves on to discuss: the encounters between the “old” world and the “new”; the emergence of a transatlantic society; industrialization in Europe and China; environmental imperialism in India; and tradition and modernity in post-colonial Africa. 80-minute daily session. This course is required of all Carnegie Mellon undergraduate degree students.

79-274 War and Society in Revolutionary Europe, 1780-1815 (9 units)

In this course, we will examine the ways in which population of Europe “experienced” violence, war and the military in Revolutionary Europe. Readings will include several primary sources, including writings by Frederick the Great and Napoleon, selections of memoirs of soldiers and officers and observers, selected public documents, as well as portions of selected secondary readings. The course will focus on Europe, although a comparative element of the European military experience in North America will also be included. The course will be a combination of lecture and discussion, plus short writing assignments. 80-minute daily session.

79-281 Russian History from Communism to Capitalism (9 units)

This course covers a broad sweep of Soviet history from the revolution in 1917 to the turmoil of the present. Spanning almost a century of upheaval and transformation, the course examines the October revolution, the ruthless power struggles of the 1920s, the triumph of Stalin, the costly industrialization and collectivization drives, the battle against fascism and the present attempts to create a market economy. The course provides essential background for anyone interested in understanding the explosive, history-making events in the former Soviet Union. 80-minute daily session.

80-100 What Philosophy Is (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 strengths, whether such weaknesses can be resolved and, if they cannot be resolved, why. 80-minute daily session.

80-130 Introduction to Ethics (9 units)

This course provides both a historic and thematic survey of Western ethical theory. Key figures such as Aristotle, Hobbes, Kant, Mill and Nietzsche will be presented as background to the thematic problems of relativism, egoism and other concepts in ethical theory. Students will take part in the creative process of developing skills necessary to engage in reflective moral reasoning. This process will culminate in the use of interactive multimedia modules simulating real-world scenarios involving difficult moral choices. Participating in a class ethics committee will provide students with opportunities for personal reflection on the ways moral reasoning can be used to expand our understanding of hard choices and moral dilemmas. 80-minute daily session.

80-180 The Nature of Language (9 units)

Linguistics is the scientific study of human language. It comprises many sub-fields, in which the different aspects of language are investigated. The topics studied in linguistics range from the mechanisms of human speech production to the nature of linguistic meaning, from historical relations among languages to current linguistic change, from writing systems to abstract linguistic structure. This course will provide a broad introduction to the field of linguistics, surveying a number of the major subfields. The focus of the course is not on describing or analyzing one particular language, but on understanding the properties and nature of language as a human phenomenon. 80-minute daily session.

80-210 Logic and Proofs (9 units)

This web-based course introduces students to central issues in logic and develops their ability for constructing and refuting arguments. It addresses the question: How can one analyze the structure of rational discourse or, more specifically, the logical structure of argumentation? An answer to this question requires: (i) uncovering the logical form of statements; (ii) defining the correctness of logical steps; (iii) formulating inference rules for the logical forms; (iv) designing

strategies for argumentation with the inference rules. The course takes these steps for both sentential and quantificational logic. Presentation: The material is presented on-line, though some exercises must be done with pen and paper. Additional reading of historical and philosophical character complements the systematic on-line presentation. Small discussion meetings with collaborative reviews, substantive discussions and critical reflections supplement the on-line material. Note that this course meets less frequently and demands significant student responsibility and self-initiative. 80-minute sessions twice weekly.

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.

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.

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.

85-211 Cognitive Psychology (9 units)

This course will examine the cognitive processes underlying perception, mental imagery, short- and long-term memory, language comprehension, decision-making, problem solving and skilled performance. Both the theory and the basic experimental findings will be covered in each area and the emphasis will be on the underlying information processing mechanisms. NOTE: Before enrolling in this course, you must first contact the APEA Director, Dr. William Alba, to verify that your background is appropriate. Students without a prior course in Psychology should take the previous course, 85-102 Introduction to Psychology. 80-minute daily session.

88-314 Politics through Film: Tyranny and Resistance (9 units)

We will use films, readings and discussions to enhance our ability to analyze, understand and explain politics. The course is about political power, authority, leadership, ideologies, war, nationalism and resistance to authority. The central themes to be discussed in both the readings and the films will be tyranny and its impact on the people, resistance to tyranny and authority, and nationalism and war. The question of tyranny will be analyzed in the context of a variety of historical experiences, including Nazi Germany, Stalin's regime, Latin American experiences and racial problems in the U.S. To analyze the problem of nationalism and war, we will use material dealing with World Wars I and II and Vietnam. Two-and-a-half hours twice weekly.

Introduction to Nanoscience and Nanotechnology

This course introduces the fundamental properties of materials with characteristic length scales in the nanometer range (1 nanometer = 0.000000001 meter), 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.

For an updated course list and schedule at the APEA website, see www.cmu.edu/enrollment/pre-college/apea.html

If you have any questions about your schedule, please contact:

Dr. William Alba, APEA Director

Email: alba@cmu.edu

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

Office: Doherty Hall 2201

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

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