Department of Philosophy Courses

Note on Course Numbers

Each Carnegie Mellon course number begins with a two-digit prefix which designates the department offering the course (76-xxxx courses are offered by the Department of English, etc.). Although each department maintains its own course numbering practices, typically the first digit after the prefix indicates the class level: xx-1xx courses are freshmen-level, xx-2xx courses are sophomore level, etc. xx-6xx courses may be either undergraduate senior-level or graduate-level, depending on the department. xx-7xx courses and higher are graduate-level. Please consult the Schedule of Classes (https://enr-apps.as.cmu.edu/open/SOC/SOCServiet) each semester for course offerings and for any necessary pre-requisites or co-requisites.

80-100 Introduction to Philosophy
All Semesters: 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.

80-101 Freshman Seminar: Mathematical Context
Fall: 9 units
This course explores historical, scientific, and philosophical contexts in which mathematics is developed, and the ways in which mathematics enables us to obtain precise descriptions of various aspects of human experience. Topics include the development of non-Euclidean geometry and Riemann's theories of manifolds with applications in cosmology, and the theory of computability with applications in cognitive psychology. Students will become familiar with fundamental set theoretic notions, as well as Turning machines and cellular automata.

80-102 Honors Program in Introduction to Philosophy
Fall and Spring: 3 units
This three credits extension of 80-100 is open to Freshmen and Sophomores by invitation of their instructor only. The seminar meetings examine interesting puzzles and open controversies concerning topics raised in 80-100.

80-109 Philosophy Freshman Seminar: Perspectives on Climate Change
Spring: 9 units
The earth’s climate has gone through many changes. Sorting through all the predictions and discussion about the changes in climate this generation will experience can be overwhelming. In this course we will look at questions about how to respond to climate change from several perspectives: history of the earth sciences, philosophy of science (what can we know?, how do we know?, what should we ask next?), and philosophical ethics. Answering such questions well relies in part on getting the facts straight, so we will also look at what scientists have to say on some relevant questions, such as: Has life on the earth ever recovered from a rapid catastrophic climatic event, and if so, how? What role do plants and animals, forests and deserts, oceans and marshlands play in creating and maintaining earth’s atmosphere? Then we will consider ethical issues, such as: What should we aim for: mitigation of climate change or adaptation to climate change --- or both? How much should the interests of future generations be valued in making decisions today, and what principles or considerations are relevant in deciding this? Is it still worth pursuing global cooperation, or should such efforts instead focus on more regionally oriented aims? Are there successful stories of responding to climate change, and if so, what morals can we draw from them?

80-110 Nature of Mathematical Reasoning
Intermittent: 9 units
This course focuses on understanding mathematical reasoning, not on mastering a particular mathematical theory like linear algebra or calculus. It explores instances of mathematical reasoning and rigorous argumentation, with examples from the history of science and mathematics. We consider the “Lets Make a Deal” puzzle, the counter-intuitive results of HIV testing, and how to assess the relative size of infinite sets, all problems which defy intuitive solution but which look simple after they are put in mathematical form. The course is designed for students at the freshman and sophomore levels who are not interested in a mathematically intense major.

80-130 Introduction to Ethics
Intermittent: 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.

80-135 Introduction to Political Philosophy
Intermittent: 9 units
As an introductory course, we will seek to trace out the historical and philosophical dimensions of the politics from its origins in Ancient Greece to its current manifestation in present-day society. Special emphasis will be placed on the concept of “democracy.” The readings and lectures will focus on the history and concept of democracy (as an idea and as an institution); the basic concepts and problems of political philosophy (e.g., liberal and libertarian ideas of justice); and applied political philosophy (e.g., regional initiatives in deliberative democracy).

80-136 Social Structure, Public Policy & Ethics
Intermittent: 9 units
The course will consider ethical questions that arise regarding social structure and public policy’s impact on both people and the environment. It will consider the role of political institutions (and, sometimes, individuals) in dealing with some of the greatest challenges facing our generation: World poverty, environmental problems, and globalization. Some of the questions we will consider include: Are developed countries like ours obligated to ameliorate poverty by providing foreign aid, are they obligated to prevent environmental problems, and is globalization and free trade in particular a good idea? The course uses theory, case studies, and empirical evidence to consider these questions from a few different moral and political perspectives. We will extract some economic principles and rational dilemmas from examining these issues and pay attention to how legal and empirical considerations interact with ethical considerations.

80-150 Nature of Reason
Intermittent: 9 units
This course offers an intellectual history of philosophical views regarding the nature of human reasoning in mathematics and the sciences, from ancient to modern times. The first part of the course traces the search for deductive methods for obtaining certain knowledge, starting with Aristotle and Euclid, and continuing through the Middle Ages and late Renaissance thought, to the work of Boole and Frege in the nineteenth century. The second part of the course considers the history of skepticism about empirical knowledge, covering Plato, Sextus Empiricus, Descartes, Pascal, and Hume, along with replies to skepticism in the works of Bayes and Kant. The third part of the course discusses theories of the nature of mind, culminating in the computational conception of mind that underlies contemporary cognitive science.
80-180 Nature of Language
Fall and Spring: 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 study 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.

80-195 Research Training
Fall and Spring: 9 units
This course is part of a set of 100-level courses offered by HSS departments as independent studies for students in the College. In general, these courses are designed to give students some real research experience through work on a faculty project or lab in ways that might stimulate and nurture subsequent interest in research participation. Faculty and students devise a personal and regularized meeting and task schedule. Each Research Training course is worth 9 units, which generally means a minimum for students of about 9 work-hours per week. These courses are offered only as electives; i.e., they cannot be applied toward a college or major requirement, although the units do count toward graduation as elective units. Additional details (including a roster and descriptions of Research Training Courses available in any given semester) are available in the HSS Academic Advisory Center. For HSS students only; only for second-semester freshmen, or first- or second-semester sophomores; minimum cumulative QPA of 3.0 (at the time of registration) required for approved entry; additional prerequisites (e.g., language proficiency) may arise out of the particular demands of the research project in question.

80-201 Epistemology
Intermittent: 9 units
Epistemology, one of the cornerstones of philosophy since ancient times, concerns the relationships between belief, truth, and knowledge. This course will explore fundamental issues in epistemology, such as the analysis of the concept of knowledge, epistemic justification and scientific method, a priori knowledge, theories of truth, skepticism, reliabilism, and coherence. Both classic texts and contemporary journal articles will be discussed. There are no prerequisites, but students with some philosophical sophistication and/or formal ability will be more comfortable with the material.

80-208 Critical Thinking
Intermittent: 9 units
This course is an introduction to practical reasoning. The course will contain an introductory element to concepts important for reasoning and decision making, such as validity, probability, and utilities. Students will extensively practice critically analyzing and evaluating a wide variety of arguments found in newspapers, magazines, and elementary accounts of scientific reasoning. In order to help students develop the skills to analyze and evaluate arguments, the course will introduce several software packages recently developed at CMU that help students diagram arguments and causal reasoning; these packages have been shown to improve students critical reasoning skills. In addition, students will learn about a wide variety of statistical, logical, psychological, and causal fallacies that are used to mislead people.

80-210 Logic and Proofs
All Semesters: 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 online, though some exercises must be done with pen and paper. Additional reading of historical and philosophical character complements the systematic on-line presentation. Weekly small discussion meetings with collaborative reviews, substantive discussions and critical reflections supplement the on-line material.

80-211 Logic and Mathematical Inquiry
Intermittent: 9 units
Since ancient times, those searching for truth have looked to mathematical arguments as a paradigm of rational inquiry. We study the structure of such arguments and their application. In the first half of the course, we develop the syntax and semantics of sentential and quantificational logic while in the second, we apply this logic to examine the axiomatic method in set theory and introduce formal models of computation. This course prepares students to take the 310-311 series on the fundamental (in)completeness and (un)decidability theorems of modern logic.

80-220 Philosophy of Science
Intermittent: 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?.

80-221 Philosophy of Social Science
Spring: 9 units
This course will explore various philosophical issues germane to social science. The central question of the course asks whether we can use traditional scientific tools to understand social phenomena, e.g., wars and religions, in the same way that we use them to understand natural phenomena, e.g., gases, lasers and planetary orbits. Some of the more specific questions we address: Because humans possess free will and act with intentions while light rays and planets in motion do not, are we forced to use logically different species of explanations in the two cases? How can we explain social institutions that depend upon cooperation? Whereas natural scientists actively conduct experiments, social scientists can often only collect statistical data. Does this difference prevent social scientists from inferring causal relations? Is our understanding of social phenomena always value laden?.

80-222 Measurement and Methodology
Spring: 9 units
This is intended as an introduction to the theory of measurement. How are units chosen? Under what conditions do qualitative relationships determine quantitative ones? We shall investigate theories of extensive measurement, with and without error. Applications will be taken from the natural and social sciences. Prerequisites: None specifically; however, students should have background in elementary logic and be comfortable with taking mathematical approaches to conceptual problems.

80-223 Philosophy of Economics
Intermittent: 9 units

80-226 Revolutions in Science
Intermittent: 9 units
Contemporary science emerged in the 17th century from a series of dramatic innovations in theory and method that has come to be called the Scientific Revolution. Since then, science has been punctuated by repeated ‘revolutions’ in which scientists have been forced to select among dramatically different frameworks for explaining the world: is the Earth or the sun at the center of the solar system? Do kinds of organisms develop from other kinds, or is each created independently? Is matter infinitely divisible or are all things made of atoms in a void? The way scientists choose one framework over another can tell us something about the nature of science. In this course, we will focus on episodes of scientific change that give insight into the range of questions in scientific change governed by a single method or does each new revolution involve the invention of a new scientific method? How do scientists argue for the existence of unobservable processes, properties, or objects like atoms? In what way do these arguments differ from those of their ancient predecessors? What makes them compelling? We'll begin our investigation by examining the overthrow of ancient Greek astronomy and physics by Galileo, Kepler, and Newton. We will then turn to a number of subsequent revolutions in other areas of science such as chemistry, geology, and evolutionary biology. Students will work with original texts by Galileo, Newton, Darwin, and others.

80-230 Ethical Theory
Spring: 9 units
Every day, even in very subtle ways, we make judgments of value that shape our lives and our conduct. This course will examine four influential attempts at providing a systematic account of the source and nature of moral value, its relationship to other kinds of value, and the practical implications of different answers to these questions. This focus on the fundamental structure of moral value will frequently engage topics such as the nature of the good, subjectivist and objectivist accounts of value, forms of moral naturalism verses attempts at moral constructivism, and will draw on historical as well as more contemporary sources. Particular attention will be paid to articulating the specific sources of disagreement that distinguish competing moral theories in order to facilitate our ability to adjudicate between them on a reasoned basis.

80-235 Political Philosophy
Intermittent: 9 units
At the heart of political philosophy lie fundamental questions such as: What constitutes a just society? How, and under what circumstances do individuals incur special political obligations to a particular state? What are the limits of the legitimate authority of the state and how are they defined? This course provides a systematic investigation of the way such questions are answered by dominant schools of liberal political theory, such as the social contract tradition, utilitarianism and libertarianism. Because the liberal political tradition is also strongly egalitarian in nature, the course will examine different conceptions of political equality and conflicting views about the respects in which community members may have a just claim to equal treatment. Readings are drawn from classic works by authors such as Hobbes, Locke, Kant, and Mill, and from the works of contemporary theorists like Rawls, Nozick and others.

80-241 Ethical Judgments in Professional Life
Intermittent: 9 units
This is a multimedia, hybrid course that examines the numerous ethical issues, problems and dilemmas that confront professionals in such areas as medicine, law, engineering, the media, government and the natural and social sciences. As a hybrid course, it includes educational materials in video streaming format, an audio CD, an electronic discussion board and web-based 'guided inquiries' that students navigate and complete. Topics discussed include: Responsibility in the professions, obligations to clients, conflicts of interest, Whistleblowing, codes of ethics and ethics in engineering, medicine, law, media, computer science and business among others. This course meets one day a week and employs a case study discussion format during class.

80-244 Environmental Ethics
Intermittent: 9 units
The aim of the course is to provide students with an introduction to environmental ethics. One aspect of environmental ethics is the study of values underlying human relations to the natural environment. In particular, we are interested in issues that arise when these values conflict. This course begins with a discussion of our current environment and different approaches to solving these crises. Many of these solutions, however, depend on particular kinds of knowledge, particularly scientific knowledge, about our environment. Thus, another important aspect of environmental ethics is determining which we do, and what we know. To address these issues, we will explore some problems in philosophy of science, with special emphasis on the various eco-sciences.

80-245 Medical Ethics
Fall: 9 units
This course provides an introduction to core ethical issues in health care, medical research, and public policy. Topics include: the moral responsibilities of health care providers to patients and various third parties such as the government or insurance companies, the status of health as a social good, and questions of individual liberty and social responsibility at the ends of life including issues such as abortion, physician assisted suicide, and the definition of death. We will also examine specific ethical issues in the conduct of medical research and look at the impact of technological innovation on our notions of health, disease, life, death, and the family. If time permits, we may also discuss issues related to genetics and cloning. While the course engages such substantive ethical issues it also attempts to sharpen students' skills in practical reasoning through argument analysis, analogical reasoning, and the application of theory and principles to particular cases.

80-246 Moral Psychology
Intermittent: 9 units
Moral psychology is the study of how we think about morality, make moral judgments, and behave in moral situations. This has important implications for how we should think about morality, make moral judgments, and behave in moral situations. In this course we will examine empirical research on moral thinking and behavior by psychologists, neuroscientists, economists, and philosophers and discuss the implications this research has for issues in ethics. We will address questions such as: What motivates our moral behavior? Do we ever act altruistically or do we only do the right thing because it's somehow in our own interest? Is it even possible to tell what people's real motivations are? How do we make moral judgments and decisions? What roles do reason, intuition, and emotion play in our moral judgments? What role should they play? What role should a person's beliefs, desires, and intentions play in our judgments of how blameworthy the person is or of how much punishment he or she deserves? What role should the outcomes of the person's actions play in our judgments of him or her? Should we hold people responsible for things that are not entirely under their control?

80-247 Ethics and Global Economics
Intermittent: 9 units
This course will cover Ancient Greek philosophy from the pre-Socratics to the later Hellenistic writers. We will prepare the background for Socrates and Plato by tracing the various historical and intellectual movements that led up to and through the flourishing and downfall of Periclean Athens. A study of Socrates (as represented in Aristophanes' comedy and Plato's early dialogues) will lead to an in-depth reading of Plato's Gorgias, Symposium and sections of the Republic. We will approach Aristotle through his 'practical philosophy' as presented in the Nicomachean Ethics. The final sections will discuss the Epicurean, Skeptic, and Stoic movements as well as the work of Cicero. Excerpts from other works of Plato and Aristotle as well as Martha Nussbaum's recent work on Aristotle and Hellenistic philosophy will accompany selected parts of the course.
80-251 Modern Philosophy
Intermittent: 9 units
Descartes' project to doubt all received knowledge and begin from scratch marked the beginning of an intellectual upheaval, helping to launch what is now called the Modern period of philosophical thought; the Western world today is the heir of modernism. Locke, Leibniz, Hume, and Kant are several of the most important figures of this period. We will examine works of these thinkers, exploring both the new sorts of questions that these philosophers raised and their new methods of doing philosophy, which together mark a fundamental break with the traditions that preceded them. We will devote special attention to the new theories of knowledge they proposed and to their works in ethics and political philosophy. The philosophical revolution of the 17th and 18th centuries occurred during a time of great scientific progress and political upheaval in Europe; as part of our course we will consider the relation of certain of these developments to the new questions and methods of the modern philosophers and to their works in ethics and political philosophy.

80-252 Kant
Intermittent: 9 units
Immanuel Kant's 'Critical philosophy' may be seen as the result of his attempts to determine the sources of human knowledge, and to find metaphysical foundations for Newton's mechanics. This course will involve readings in Kant's 'Critique of Pure Reason' and other texts. Emphasis will be placed on understanding Kant's thought in the context of contemporary intellectual developments and on his theory of human cognition.

80-253 Continental Philosophy
Intermittent: 9 units
This course provides students with an overview of key historical and philosophical movements in European Philosophy. The cultural and historical background for 20th Century Continental Philosophy covers Descartes, Kant, Kierkegaard, and Nietzsche (Hegel and Marx are also options). Early to mid-20th Century Continental Philosophy covers the central tenets of phenomenology and existentialism (e.g., intentionality, Being-in-the-World, Bad Faith). This part will involve selections from the works of, for example, Husserl, Heidegger, Sartre and Merleau-Ponty. Finally, cultural and philosophical trends such as Structuralism, Hermeneutics and Post-modernism (e.g., Derrida, Foucault, Lyotard and Habermas) will be addressed.

80-254 Analytic Philosophy
Intermittent: 9 units
This course examines the revolutionary impact of philosophy at the turn of the 20th century on contemporary thought and progress. By the 1920s some scientists and philosophers became hopeful that the end of the long tradition of philosophical deadlock was finally within reach. Buoyed in particular by Einstein's theory of relativity and the invention of modern logic, they created a new kind of philosophy with the goal of applying logical and empirical methods to philosophical problems. This new approach led to new puzzles and paradoxes, along with a focus on the age old question of what can be known and what is meaningful. The modern fields of linguistics, cognitive science, and information and computer sciences all owe a debt to these sources, as does of course contemporary philosophy. Our quest will be to understand both what authors like Frege, Russell, and the Vienna Circle were up to in the first place, and how their work contributed to the world we live in today.

80-255 Pragmatism
Intermittent: 9 units
American Pragmatism represents an energetic attempt to bridge the divergent cultures of science and the humanities. The movement's founder, C.S. Peirce, was trained in chemistry and worked as a physicist, but he was also deeply concerned with the contemporary philosophical portrayal of science, which distinguished sharply between theoretical knowledge and practice. Peirce responded by constructing a comprehensive philosophy emphasizing the scientific importance of community, fallibility, and action. Pragmatism was also developed and vigorously popularized by William James, who aspired to be a painter and ended up as an acknowledged founder of modern empirical psychology. James extended Peirce's position by defending the role of values in even the purest of empirical sciences.

80-256 Modern Moral Philosophy
Intermittent: 9 units
This course will address some of the central aesthetic theories concerning the nature of our judgments of the beautiful and of the sublime that were developed around the 19th century. The famous divide between the British empiricist philosophers and the rationalist philosophers of the Continent regarding the sources of human knowledge, was paralleled in a dispute regarding the nature of aesthetic judgments. In this course we will study the aesthetic theories of some of the most important figures of this period, with an emphasis on the work of Immanuel Kant.

80-257 Nietzsche
Intermittent: 9 units
During his life in the late 19th-century, Friedrich Nietzsche was a relatively obscure German philosopher. Since his death, however, he has become deeply influential and well-known, and was a source of inspiration for many important 20th-century thinkers. Despite this popularity, Nietzsche's philosophy remains relatively mysterious, and often misunderstood. Much of his writing consisted of aphorisms, rather than more traditional prose and arguments, and many of his positions seem to contradict one another. This course will cover a broad range of Nietzsche's writings, focusing on such central concepts as the will to power, eternal recurrence, and the oft misunderstood Ubermensch ("overman"). Throughout, we will focus on developing a consistent interpretation of an enigmatic philosopher whose views have been mischaracterized and misappropriated throughout the past century.

80-258 Hume
Intermittent: 9 units
This course will investigate the philosophy of David Hume. We will focus on his philosophical thought expressed in the book A Treatise of Human Nature. Hume was an influential philosopher who wrote on many issues ranging from skepticism, to ethics, to the philosophy of science, and his views continue to be influential today. In this course we will attempt to understand Hume's philosophy on all of these subjects both to better understand his contribution to the philosophy of his day, but also to see what his arguments can contribute to contemporary thought.

80-261 Empiricism and Rationalism
Intermittent: 9 units
A central issue in Western philosophy has been whether reason or experience (or some of both?) lies at the foundation of human knowledge, and the 17th and 18th centuries are a defining period of European history because they contribute the basic model of science and the ideals of intellectual and political enlightenment that are still dominant today. Specifically, we will focus on the problems encountered in trying to give an adequate account of the nature of the external world, the structure of consciousness, and the nature of our knowledge of the world. Corresponding to the major philosophers of the period, we will study the ideas of Descartes, Locke, Leibniz, Berkeley, and Hume. The course has two main goals: (1) to study the metaphysical and epistemological theories of selected philosophers, paying close attention to the arguments offered on behalf of very strange positions, and (2) to help you improve your analytical and critical skills, including, for example, extracting and evaluating philosophical arguments.

80-262 Introduction to the Philosophy of Bertrand Russell
Intermittent: 9 units
Near the start of the 20th Century, Bertrand Russell helped to create what today we call "Analytic Philosophy." We will study Russell's contributions to this important approach to Philosophy by using his 1912 book, "The Problems of Philosophy" as a springboard to other readings. The issues we'll cover include several specific challenges in the Theory of Knowledge and Perception. For example, What is the difference between appearance and reality, and can we tell? Also, we'll consider issues that stem from reflecting on our thinking. For example, What constitutes a philosophical question?

80-264 William James and Psychological Philosophy
Intermittent: 9 units
This course will be devoted to the reading and discussion of William James' "Principles of Psychology," including its relevance to foundational questions about current research. Though first published in 1891, the foundational issues addressed in this landmark work have not lost their relevance; it is often said that this work set the agendas for much of the research subsequently carried out in psychology. This course should appeal to anyone interested in philosophy of mind, philosophy of psychology, and philosophy of science.
80-270 Philosophy of Mind
Intermittent: 9 units

The mind poses one of the greatest challenges to understanding how the world works. What is a mind? What is consciousness? What is sensing? What is agency? How are these facets of subjectivity related to the objective physical world? In this course, we tackle these challenging questions with a philosophical approach that highlights analysis and argument, though we will also bring in relevant empirical understanding of the mind and brain to enrich our discussion (a complementary course, Philosophy and Psychology, is taught in alternate years where the empirical issues are the focus with enrichment from philosophy). A central practical aim of this course is to promote development of analytical skills through practice engaging with arguments.

80-271 Philosophy and Psychology
Intermittent: 9 units

This course has two parts. First, we will look at basic concepts used in psychology (and cognitive science broadly) through the lens of philosophy including: representation, computation, information, explanation, modularity, attention, automaticity and control. Having some concrete proposals about these ideas will allow us to formulate psychological claims more concretely. Second, we will reverse course and look at traditional philosophical problems through the lens of psychology focusing on three topics: consciousness, agency, and perception. Specifically: what is consciousness, what is it to be an agent, what is it to perceive.

80-275 Metaphysics
Intermittent: 9 units

The topical agenda of this course will vary. Typical topics include the problem of personal identity, the nature of human freedom, the nature of the self, the nature of reality and being, the nature of causality, and the question of whether solutions to such problems can be given. Classical as well as contemporary philosophic texts will be studied. For Spring 2011: Issues we will consider, in no particular order, include: Do properties exist? Why should you think there is an external world? What is a number? Why should you think other people have mental states? What are natural kinds? What constitutes the identity of things through time? What constitutes the identity of persons through time? What does determinism mean? Is there freedom of the will? What is possibility? What is necessity? Are there other possible worlds? When does one event cause another, and what does that mean? What could a deity be, and should you think there is one?

80-276 Philosophy of Religion
Intermittent: 9 units

In order to expand our ideas about what religion could be, the course begins with a brief cross-cultural review of some major religious traditions around the world. Then we turn to some more traditional arguments for and against theism, including: logical, ontological, cosmological, the argument from religious experience, the argument from miracles and historical testimony, and the problem of evil. We will also consider whether morality ultimately depends on God's sanctions and (yes, here it is at Carnegie Mellon) whether life would be meaningless if God did not exist.

80-280 Linguistic Analysis
Intermittent: 9 units

At one level, language is constituted by nothing but sounds, or marks on paper. How can such physical objects be used to create or transmit meaning? The answer assumed in this course is that objects with specific physical features are assigned symbolic or linguistic values on the basis of those features. By the juxtaposition of such objects (phonemes or graphemes), larger symbolic objects are created (morphemes). Morphemes have the special property that they can be associated in a consistent way with other sounds. In a progressive fashion, words are built from morphemes, phrases from words, and sentences from phrases. Sentences have different meanings. In a progressive fashion, words are built from morphemes, phrases from words, and sentences from phrases. Sentences have different meanings. In a progressive fashion, words are built from morphemes, phrases from words, and sentences from phrases. Sentences have different meanings. In a progressive fashion, words are built from morphemes, phrases from words, and sentences from phrases. Sentences have different meanings.

80-281 Language and Thought
Intermittent: 9 units

We use language to communicate. Communication seems to involve something like the transfer of ideas or thoughts from one individual to another. In this course, we will try to understand how that works, given that we cannot in fact take our thoughts out of our heads and show them to someone else. We will explore different views on the relationship between thought and meaning, and different views about how language succeeds in communicating thoughts and ideas. We will explore the idea of a language of thought, and ask whether the language we speak influences our thought. At the same time, we will want to understand how it is that language hooks up to the world, enabling us to talk not only about what we think, but also about the way things actually are. We will look at the role of inference in language understanding, and at the nature of non-literal communication, in particular metaphor. The course will be based on readings drawn from philosophy, linguistics and psychology.

80-282 Phonetics and Phonology I
Fall: 9 units

This course seeks to describe the sounds of human languages in a linguistically relevant fashion. The challenge is that at a shee physical level, every speech sound is different than every other speech sound. This is true within the speech of an individual, between sounds produced by different speakers of the same dialect, and across dialects within a language. Still, some sounds are considered by speakers to be the same as other sounds, and this is what makes communication with spoken language possible. On the flip side, some sounds must be recognized as different from one another. How is this phonic structure of the sounds of human language?

80-283 Syntax and Discourse
Intermittent: 9 units

This course builds on and expands the basic syntactic analysis skills learned in 80-180 Nature of Language, and applies them to an exploration of the ways in which syntactic structure can be manipulated in different languages to reflect the status of content as old or new, foregrounded or backgrounded, connected to ongoing discourse or not. More generally, the course provides an examination of the interaction between syntactic structure and discourse structure, with reference to English and other languages. The course will begin with review of the basic syntax from Nature of Language (head/argument structure, constituency tests, complement/adjunct distinction) and will then develop syntactic theory further, based on analysis of declarative sentences in English and one other language. We will then begin the analysis of manipulations of basic sentence structure such as fronting, left- and right-dislocation, clefting and passivization, exploring in parallel the syntactic description of such structures and their semantic/pragmatic functions, using appropriate theoretical concepts. The course will provide students with tools to reason about and represent syntactic structure, and to accurately characterize the discourse-related properties of different sentence types. Prerequisite: 80-180

80-291 Fall: 9 units

This course emphasizes the philosophical, cultural, and sociological aspects of multimedia. The course will explore these issues historically and thematically by looking at central figures in the early days of computers and communication theory (e.g., Alan Turing and Claude Shannon) and recent work by writers such as Brenda Laurel (Computers as Theatre), George Landow (HyperText 2.0), and Janet Murray (Hamlet on the Holodeck: The Future of Narrative in Cyberspace). This is not a technical course in issues relating to the creation of multimedia software. It is a course concerned with the meaning of multimedia authoring in its contemporary societal context.
80-305 Rational Choice  
Intermittent: 9 units  
This course will cover selected topics in rational choice theory, which informally is the analysis of how to make a correct decision in a given context. The course offers an introduction to the main normative theories of rational choice: von Neumann-Morgenstern theory of expected utility, Anscombe-Aumann’s account and Savage’s theory of choice under uncertainty. The course also includes an introduction to the main descriptive accounts of decision making used in Psychology and Economics. Possible topics may include, and are not limited to: a review of the main theories of non-expected utility and related issues in the psychology of judgment and decision making (especially recent advances extending Rank Dependent Utility and Prospect Theory). We will discuss and try to understand the case for and against the Bayesian assumption that the decision maker’s beliefs can always be represented by a unique probability distribution. This course will stress the role that formal methods can play in the analysis of decisions and alternative applications of decision theory to issues in philosophy and social science.

80-310 Formal Logic  
Fall: 9 units  
Among the most significant developments in modern logic is the formal analysis of the notions of provability and logical consequence for the logic of relations and quantification, known as first-order logic. These notions are related by the soundness and completeness theorems: a logical formula is provable if and only if it is true under every interpretation. This course provides a formal specification of the syntax and semantics of first-order logic and then proves the soundness and completeness theorems. Other topics may include: basic model theory, intuitionistic, modal, and higher-order logics.  
Prerequisites: 15-251 or 80-210 or 80-211 or 80-212.

80-311 Undecidability and Incompleteness  
Spring: 9 units  
UI focuses on two central problems of mathematical logic: the undecidability of predicate logic (established by Church and Turing) and the incompleteness of formal theories (discovered by Gödel) for theories that contain a modicum of set or number theory). The mathematical solutions of these problems involve a rigorous concept of computability or calculability that turned out to be fundamental for computer science, but also cognitive science. We first discuss predicate logic and systematic ways of constructing proofs, that is followed by the formal development of elementary set theory. The concept of Turing machine computation is introduced and shown to be equivalent to the concept of recursive function. That provides the mathematical, methodologically adequate tools for establishing the results mentioned above. The mathematical and computational notions and results are among the most significant contributions of logic, not just to the solution of internal logical questions and to the foundations of computer science, but also to (the beginnings of) a deeper understanding of the human mind and mental processes. In addition to the mathematical developments, we will discuss historical and philosophical aspects of the subject.  
Prerequisites: 15-251 or 21-300 or 80-210 or 80-211 or 80-310.

80-312 Philosophy of Mathematics  
Intermittent: 9 units  
The 20th century witnessed remarkable and novel developments of mathematics - with deep roots in the 19th century. The beginnings of these developments were beset with foundational problems and provoked a variety of programmatic responses: logicism, intuitionism, and finitism. For a deeper study of basic issues, we review a part of classical Greek mathematics (the theory of proportions) that is closely connected to the foundations of analysis in the 19th century. We analyze set theoretic and constructive approaches, and discuss fundamental metamathematical results and their philosophical implications. A "reductive structuralist" position will finally provide a perspective for understanding the abstract character of mathematics as well as its usefulness in applications.  
Prerequisites: 80-211 or 80-310 or 80-311.

80-313 Philosophical Logic  
Intermittent: 9 units  
A survey of the areas of logic that every philosophical logician must know, most philosophers should know, and any philosophy student may wish to know: modal logic, epistemic logic, temporal logic, intuitionistic logic, higher-order logic, constructive logic and type theory, relevance logic, conditionals, Kripke semantics, Scott-Montague Semantics, probabilistic semantics and others. In various cases we will discuss recent work including unpublished papers and book drafts. We will cover both the formal details and the philosophical adequacy of the various surveyed formalisms.  
Prerequisites: 80-310 or equivalent.

80-314 Logic and Artificial Intelligence  
Intermittent: 9 units  
Logic has played a central role in the development of artificial intelligence, and continues to do so today. The first half of the course will be on "classical" logical AI, starting with Newell Simon’s General Problem Solver and McCarthy’s Situation Calculus, before moving on to more recent developments in default reasoning, logic programming, epistemic logic, and description logic. After discussing links between non-monotonic reasoning and probability, the second half of the course will focus on current attempts to combine logic and probability/statistics for AI applications, including Markov Logic, probabilistic programming approaches, and several others. We will highlight the logical aspects of these tools, and more generally discuss the role logic can play in modern AI. Philosophical issues in AI will also be discussed.  
Prerequisites: Background in both logic and artificial intelligence would be useful. However, a solid background in one but not the other should also be fine. We will assume basic (propositional and first-order) logic as well as basic probability.

80-315 Modal Logic  
Fall: 9 units  
This course is an introduction to modal logic and its applications in philosophy, computer science, linguistics, and economics. The first part of the course is a rigorous development of propositional modal logic: the basic language, interpretation in relational structures, axiom systems, proofs, and validity. We will prove soundness and completeness of various systems using the canonical model method, examine notions of model equivalence, establish the finite model property, and discuss decidability and basic complexity results. We will also consider alternatives to relational structures, such as topological semantics and neighbourhood semantics, and introduce modal predicate logic, incorporating first-order quantification into the system. The second part of the course focuses on specific types of modality and their applications, including temporal and dynamic logics, deontic logics, logics for reasoning about counterfactuals, epistemic and doxastic logics, and justification logic. We will conclude with a detailed look at multi-agent systems, the notion of common knowledge, and a glimpse of its foundational role in game theory.

80-321 Causation, Law, and Social Policy  
Intermittent: 9 units  
Policy makers face causal questions. For example, does violence on TV cause violence in life, and if so, what policies can we institute that will actually curb it? Does the death penalty actually deter criminals? Do tough drug laws reduce drug use? This course investigates how scientists establish causal claims, and how policy makers and the courts rely on or systematically ignore such science. We examine what causal claims mean and how they connect to statistical data, and we discuss the limits of standard techniques for establishing causal claims. We will consider all of these issues first theoretically, and then in the context of several case studies chosen mostly by the students. Knowledge of social science and/or statistics is not required, but is desirable. 
Prerequisite: 36-201.

80-322 Philosophy of Physics  
Intermittent: 9 units  
Philosophical problems in the development of modern physics. Topics include the philosophical significance of Einstein’s theory of relativity, interpretations of quantum mechanics, and the relationship between these two theories. Other topics may include the philosophy of space and time, the epistemology of geometry, the significance of modern cosmology, and chaos theory.

80-323 Philosophy of Biology  
Intermittent: 9 units  
This course will examine a range of foundational problems in evolutionary biology, as well as the implications of evolutionary biology for some basic topics in philosophy. Issues to be discussed include the meanings and roles of a variety of central concepts (such as species, fitness, function and adaptation) and controversies over adaptationism, genetic information, units of selection and the evolutionary explanation of human behavior. This course will be accessible both to philosophers interested in the epistemological and metaphysical status of evolutionary biology, and to biologists interested in better understanding the foundations of their field. Although there are no formal prerequisites for this course, students will be expected to have taken courses in either philosophy or biology.
80-324 Philosophy of Economics
Intermittent: 9 units
The science of economics has come to occupy a central position in contemporary society. Because of this central position in political decision making, economics is intertwined with a number of other philosophical issues surrounding justice, rights, and fairness. The central theme of this course will be on the arguments in favor and against markets as effective solutions to political problems. This issue will allow us to analyze a wide number of foundational issues in economics including the testability of economic claims, the use of ?rationality? postulates, the foundation of the right to property, and measuring the success or failure of an economy.

80-335 Deliberative Democracy: Theory and Practice
Intermittent: 9 units
This course will explore the theory and practice of deliberative democracy. Topics and concepts to be discussed include distinctions between aggregative and deliberative models of democracy, the notions of Reciprocity, Publicity, and Accountability as they apply to policy discussions, and recent work in Citizenship Theory. We will also look at various practices that utilize the theories of deliberative democracy, such as Participatory Budget Planning, Deliberative Polls®, and Action Forums.

80-337 Philosophy, Politics & Economics
Intermittent: 9 units
The course is split between two broad topics. First, we explore issues pertaining to Individual Decision Theory, mainly the postulate of rationality and its implications. We then proceed to discuss collective decision making by a group of rational agents. We discuss methods of aggregating individual preferences and, in particular, measures of social welfare, in an effort to associate the evaluation of policy with ethical principles.

80-341 Computers, Society and Ethics
Intermittent: 9 units
This course explores many of the social and ethical issues that have emerged in the wake of the significant advances that we have witnessed in computer science and information technology (IT). Computers and communications technologies have had an increasing impact on the whole of society and have raised new and difficult ethical questions. In turn, these ethical issues have spurred the need for a consideration of new policies and regulations. In this new world of IT, some are concerned about the protection of their privacy while others find problems of censorship and, more generally, restrictions on information access to be their main focus as a problematic social issue. This course will address these and other issues such as: questions of free speech, surveillance in the workplace, intellectual property and copyright, information acquisition and ethics and the Internet.

80-344 Management, Environment, and Ethics
Intermittent: 9 units
This course examines and poses answers to the following question: “What are the legitimate environmental responsibilities of organizational managers from the private, public and nonprofit sectors and how can they be best fulfilled?” This query will provide the course with its major theme and framework. But in order to do justice to it, three interrelated areas that are presupposed by this question will need to be explored first. These areas are: 1) applied ethics, 2) management ethics and 3) environmental ethics. The first half of the course will concentrate upon these three areas. The second half of the course will focus upon management and the environment employing the insights gained during the first half. Here students will review and evaluate past and current management practices with respect to the environment, organizational policies dealing with the environment and the role of government in the process of determining environmental responsibilities in management. Environmental concerns on the international level and their impact upon organizational management, the emergence of the "environmental affairs manager" within organizations, balancing environmental responsibilities with other management responsibilities and examples of management responses to the environmental crises will also be examined during this portion of the course.

80-348 Health Development and Human Rights
Fall: 9 units
Approximately 1.1 billion people live on less than $1 a day in a condition the World Bank refers to as extreme poverty. Those who live in extreme poverty frequently lack effective access to proper nutrition, adequate shelter, safe drinking water, and sanitation. As a result, they also bear the greatest burdens of famine and epidemic disease and frequently face social and political conditions of unrest and systematic oppression. This course examines the question of what, if anything, we in the technologically and economically developed world owe to the global poor. It therefore focuses considerable attention on competing theories of global distributive justice and the relationship between poverty, poor health, and human rights. We will critically examine different strategies for international development that emphasize one or more of these variables and we will consider how information about the complex interrelationship of these variables should be factored into the development process.

80-351 Kant
Intermittent: 9 units

80-363 19th Century Foundations of Science
Intermittent: 9 units
To represent or *picture* aspects of the world through mathematical and other models was a distinctive way of looking at science in the late 19th century. It has important precedents and is again influential in contemporary discussions in philosophy of science that employ a model-based approach. We are going to examine scientific and mathematical developments in the 19th century and connect them to both classical as well as to contemporary philosophical work. Intellectual and popular scientific writings in Logic, Mathematics, Physics, and Psychology will be set in the context of the technology and culture of the era. Authors to be studied will include Boole, Jevons, Frege, Gauss, Dedekind, Hilbert, Poincare; Maxwell, Hertz, Boltzmann; Lotze, Peirce, James, Helmholtz.

80-365 Ramsey
Intermittent: 9 units
Frank Ramsey played a crucial intellectual role in the Cambridge of Russell, Moore, Wittgenstein and Keynes (just to mention some central figures of the exceptionally lively and creative atmosphere of Cambridge at the beginning of the past century). During his short life (he died in 1930 at the age of only 26) he made decisive contributions to epistemology, decision theory, philosophical and mathematical logic, philosophy of mathematics, metaphysics and philosophy of science. Just to mention an example, his paper 'Truth and Probability' laid the foundations of the modern theory of subjective probability and also those of modern utility theory and decision theory. The entire core of Ramsey's philosophical and scientific work consists of no more than 15 papers. But in all cases they are remarkable essays that changed the intellectual topics they touched. Moreover they all contain the same view of philosophy merging a sound portion of Moorean realism with Ramsey's kind of pragmatist philosophy. The course reviews these central papers and its rich relations with the Cambridge philosophers of this time and the Vienna Circle. In addition it is remarkable that most of Ramsey's views remain valid today almost a century after his death. So, the course considers as well the impact of Ramsey's views in contemporary analytic philosophers and those influenced by early American pragmatism. The Ramsey Collection at the University of Pittsburgh comprises an almost complete collection of autograph material by Ramsey, roughly 1.500 autograph pages in all. I am doing some historical research on this material which I intend to incorporate as additional material for the course.
80-380 Philosophy of Language
Intermittent: 9 units
There is a robust interplay between the study of language in philosophy, and the study of meaning in current linguistics. Many of the foundational concepts on which linguistic semantics and pragmatics are based were developed by philosophers, or have been examined and critiqued by philosophers. In the other direction, some philosophers have adopted linguistic theories and methodologies in pursuing philosophical questions about language. This course will examine a range of topics in the philosophical and philosophical linguistics. The primary focus will be on exploring the philosophical foundations of current work in linguistic semantics and pragmatics. Rather than presenting a standard survey of classical work in the philosophy of language, the course will focus on philosophical work which is of relevance to the practice of linguistics today. The course will involve detailed reading of papers taken from the literature, some of them of a technical nature. All relevant concepts will be explained, but students need to be willing to grapple with difficult material. The course can be taken as a stand-alone course, and no special knowledge of linguistics will be assumed. However, the course may be of particular interest to students who have taken or are taking courses in semantics and pragmatics, and wish to deepen their understanding of fundamental concepts in those domains. In general, the course should be of interest to any students who would like to understand the foundations of current approaches to the systematic study of linguistic meaning. Prerequisites: 76-101 or 80-100.

80-381 Meaning in Language
Intermittent: 9 units
This course is an introduction to the study of meaning from a linguistic perspective. Linguists studying meaning need to be able to say what the meanings of sentences are, and to explain how those meanings are constructed from the meanings of sentence parts: words, morphemes and syntactic structure. In this course, we’ll focus on developing a vocabulary for talking about the truth conditional content of sentences: the part of meaning that has to do with representing the world as being a particular way. We’ll also investigate how particular words and constructions affect the appropriateness conditions of sentences in which they occur, that is, the conditions under which those sentences can be appropriately used in discourse. As we’ll see, many linguistic items affect sentence meaning in both of these ways simultaneously. The semantic contributions of a wide range of linguistic forms will be covered in the course. By the end of the semester, you will be able to state clearly what the difference is between the noun phrases “a dog” and “the dog”; you’ll understand the difference between the sentence “All dogs have tails” and the sentence “Dogs have tails”; and you’ll know why the sentence “John left yesterday” sounds fine but the sentence “John has left yesterday” doesn’t. You’ll know how to talk about the meanings of sentences with modals, like “John might have left”, and you’ll understand what the difference is between saying “John didn’t see Bill” and saying “John didn’t see Bill”. All this, and more. While the course will develop precise ways of talking about meaning, it will not be particularly technical. (The amount of technical material to be introduced will be determined on the basis of the skills and interests of students.) Material in the course will presuppose a basic knowledge of linguistic notions, as covered in 80-180 Nature of Language. Prerequisite: 80-180.

80-382 Phonetics and Phonology II
Intermittent: 9 units
This course is a continuation of Phonetics and Phonology I (80-282) and is designed to expand upon the phonetic skills developed in that course, while delving more thoroughly into various issues central to phonology. We will focus primarily on consonants and the phonetic principles that govern their realization, with a special emphasis on voicing. We will learn about how articulatory and acoustic principles give rise to voicing assimilation, final devoicing and the interaction of consonant voicing and tone. The exploration will be hands on, and we will learn how to measure voice onset time, analyze stop bursts and fricative noise and see how the voicing of a consonant affects the pitch of the following vowel, using Praat. On the phonological side, we will consider various ways in which voicing contrasts and processes have been represented, including SPE-style binary features, feature geometry and Optimality Theory. One of the central themes will be how to reconcile phonological accounts of voicing phenomena with our understanding of the underlying phonetic principles. Both rule-based and constraint-based approaches to phonology rely on discrete symbols, whether they be phones or features, but the speech stream is not neatly divided into segment-sized units, and the features of phonological theory are typically spread over multiple segments. Additionally, many phonological explanations recapitulate phonetic principles, calling into question what we consider to be an explanation of sound patterns. The course will culminate in some approaches to understanding how phonetics and phonology interact. Prerequisites: 80-180 and 80-282.

80-383 Language in Use
Intermittent: 9 units
We use language to communicate, to convey meaning. But not all of what we mean is contained in encoded language. Suppose you ask me, "Is Jane coming to the party?" and I reply "She has to finish her homework?" The pronoun "she" encodes the information that I am referring to some female individual; but does not encode the information that I intend to refer specifically to Jane. This, the addressee has to figure out given the use of the sentence in that particular context. Nor does the sentence encode the actual answer to the original question. It is clear in the context that the intended answer is "No!", but again, this is something which the speaker relies on the hearer being able to figure out in the context of use. In other situations of use, an utterance of the same sentence would not convey that meaning. The investigation of inferences about speaker meaning that arise from the use of language in particular contexts is part of the field of linguistic pragmatics, which is the topic of this course. Linguistic pragmatics is also, though, concerned with some aspects of encoded meaning. In addition to the words and constructions which contribute ordinary truth-conditional content to the meaning of an utterance, there are words and constructions which serve as indicators of the function of a sentence, or of how it is intended to fit into a discourse, or of the assumptions that the speaker is making that motivate her utterance. To characterize the meanings or functions of such expressions, we need, again, to make reference to contexts and speakers: features of the uses of linguistic forms. This course provides an introduction to the investigation of pragmatic features of language. We will aim to develop a "toolkit" for pragmatic analysis to enable students to address questions about the pragmatic features of language and languages that they encounter. Prerequisites: 80-180 or 80-180.

80-384 Linguistics of Turkic Languages
Intermittent: 9 units
In this course we will look at the phonology, morphology, syntax and writing systems of languages within a single language group, Turkic. Turkic languages are spoken across continental Asia and include such languages as Turkmen, Tatar, Kazakh, Kirghiz, and Uzbek. In this course we will concentrate especially on Turkish, Azerbaijani, and Yukut. We will look at the sound systems of these languages to discover how they are related, and we will also look comparatively at various morphological and syntactic structures. We will consider the impact of diachronic factors on the synchronic study of language, and we will also examine certain recent techniques used to establish genetic relations between languages. To a large extent the course will be student-driven, and it can be seen as an extended case study for applying concepts and analytical strategies taught in Nature of Language, Phonetics and Phonology, Linguistic Analysis, and other relevant courses. Prerequisites: 80180 Nature of Language Prerequisite: 80-180.

80-385 Linguistics of Germanic Languages
Intermittent: 9 units
TBD.

80-387 Natural Language Syntax
Fall: 9 units
TBA.

80-389 Natural Language Syntax
Fall: 9 units
This course is intended to provide an introduction to the methods of syntactic analysis, and to some major themes of contemporary syntactic theory, following up on syntactic concepts introduced in 80180, Nature of Language. A primary theme of the course is the structural constituency of a sentence, and the course will address some of the following questions. What are syntactic constituents? Do all aspects of syntax manipulate the same kinds of structural units, or do different grammatical processes rest on incompatible notions of constituency? How do other syntactic relations connect with constituent structure? To the extent that there is mismatch between different notions of syntactic structure, how can it be reconciled within a theory of grammar? These questions are engaged in through the diagnostics and techniques of modern syntactic analysis and argumentation. Those tools will allow us to explore the striking ways in which syntactic theory unifies diverse grammatical phenomena in terms of a common notion of phrase structure. The course complements 80280, Linguistic Analysis, building on but not presupposing syntactic analyses developed in that class.
80-391 Morality Play: Laboratory for Interactive Media and Values Education
Intermittent: 12 units
What do you get when you cross cutting edge interactive media technologies with inquiry into the big questions of human existence? Let's find out! New technologies-including online gaming, interactive film, "social" media, podcasts and smartphone apps-have enormous potential to change the way people learn. Especially intriguing is their potential to promote active, exploratory learning. We have only scratched the surface of this potential. Imagine interactive technologies that impart a deep understanding of the human condition. Imagine the compelling motivational strategies of well-designed games used to spark inquiry and scientific curiosity. Imagine experience that deepens our capacity for critical thinking, empathy or compassion. What if we applied absorbing interactive media to the task of delivering a first-rate humane education? In this course, we will explore a topic of elemental human concern (e.g. inequality, abortion and human reproduction, the nature of the social contract, the separation of church and state, population and sustainability '205) and develop a deep, interdisciplinary understanding of the issue. Then, instead of producing a term paper, we'll collaborate with a team from CMU's Entertainment Technology Center (ETC) to design and prototype a next-generation learning tool that brings the issue to life. The result will push the boundaries of what is possible in the way of technologically mediated learning.

80-405 Game Theory
Intermittent: 9 units
Game theory is the branch of decision theory in which decision problems interact. This course will cover those parts of game theory of special interest to social scientists and philosophers. We will discuss specific elements of the formal theory, including: the distinction between cooperative and non-cooperative games, games in the strategic and the extensive form, solution concepts, epistemic conditions needed to predict outcomes of games, equilibrium refinements, dynamical models of equilibrium selection, and folk theorems of indefinitely repeated games. We will discuss results in experimental economics that test some of the assumptions of classical game theory. Throughout the course we will examine applications of the formal concepts of game theory to problems in moral and political philosophy and the social sciences. Prerequisites: background either in decision theory, rational choice, probability, or statistics.

80-411 Proof Theory
Intermittent: 9 units
Proof Theory is one of the core subjects of mathematical logic. It interacts with central issues in computer science, artificial intelligence as well as mathematics but also with broader methodological, philosophical questions. This course presents a theory of formal proofs that serve to represent mathematical arguments. We first study proofs in natural deduction and sequent calculi. We show that every proof is reducible to a normal one; normal proofs have an important internal structure and are critical for automated theorem proving and proof search. They are also critical for metamathematical studies that concern, for example, consistency and decidability. We then examine frameworks for the formalization of mathematical practice: starting with arithmetic and ending with Zermelo-Fraenkel set theory, after having made a detour through Church's simple type theory. As strict formalization is here not just a matter of principle but of real practice, we will discuss interactive theorem proving systems (APRós, Isabelle, Twelf) that can be used for the formal verification of mathematical proofs. (Finally, Gödel's second incompleteness theorem (of 1931) is the starting point for considering an extension of Hilbert's finitist consistency program. (We will establish Gödel's theorem for set theory and arithmetic.) We present, as a paradigm of pre-Gödelian investigations, the consistency proof Hilbert Bernays gave in 1922 for a quantifier-free part of arithmetic. Then we discuss the Gödel-Gentzen-reduction of classical to intuitionist arithmetic and present Gentzen's 1936 consistency proof of the latter by transfinte induction (up to epsilon-0). We stage every stage of our investigations, we will pay particular attention to a more external, conceptual structure of proofs that facilitates interactive theorem proving and lays the basis for automated proof search as well. Prerequisites: 21-300 or 80-310 or 80-311.

80-413 Category Theory
Intermittent: 9 units
Category theory is a formal framework devoted to studying the structural relationships between mathematical objects. Developed in the mid-20th century to attack abstract problems, it has led to many new developments in mathematics. We will consider the basic facts of category theory. In the second part of the course, we will investigate the application of these results to concrete examples from logic and algebra.

80-430 Ethics and Medical Research
Intermittent: 9 units
Ethics Medical Research: This course covers foundational issues in the ethical evaluation and regulation of research involving human subjects. It begins with a historical overview of the origins of research ethics after World War II as a response to high profile cases of abuse or scandal. This unit covers "classic cases" including the Tuskegee syphilis study, the Willowbrook hepatitis study, the Jewish Chronic Disease Hospital Case, and others. It also covers seminal documents such as the Nuremberg Code, the Belmont Report, and the current federal regulations known as the Common Rule. Against this historical backdrop, the course then examines foundational philosophical issues in human-subjects research including ethical issues in clinical trial design, the concept of equipoise and the use of placebo controls, the requirements of justice in the research context, and the values of privacy and informed consent.

80-447 Global Justice
Intermittent: 9 units
Until recently, the dominant view of international relations among both academics and politicians was that governments and citizens of one country have no moral or legal obligations to anyone beyond their own borders. The later half of the 20th century has seen a dramatic change in this attitude, with a much greater willingness to recognize that demands of justice may transcend national borders and bind different states and their people. This course examines this shift through the lenses of history, philosophy, law, politics, and anthropology. It is being offered in conjunction with the 2009-2010 Humanities Center Colloquium Series on "Global Connections." Topics covered include: theories of justice: sovereignty; the universality of human rights; global inequality and poverty; trade and labor in the global economy; climate change; humanitarian intervention and just war; post-conflict reconciliation and social reconstruction; as well as the emergence of transnational modes of governance. In addition to several short writing assignments, students will have the opportunity to carry out a research project on a relevant topic of their choice.
80-514 Categorical Logic Seminar
Intermittent: 9 units
This course focuses on applications of category theory in logic and computer science. A leading idea is functorial semantics, according to which a model of a logical theory is a set-valued functor on a category determined by the theory. This gives rise to a syntax-invariant notion of a theory and introduces many algebraic methods into logic, leading naturally to the universal and other general models that distinguish functorial from classical semantics. Such categorical models occur, for example, in denotational semantics, e.g. treating the lambda-calculus via the theory of Cartesian closed categories. Similarly, higher-order logic is treated categorically by the theory of topos. Note: this course will begin with a 3 week refresher of basic category theory. C2 students can start after immigration by reviewing on their own.
Prerequisite: 80-413.

80-515 Seminar on the Foundations of Statistics
Intermittent: 9 units
This coming Spring 2014 Foundations of Statistics seminar (36-835 / 80-815) will be about the seminal contributions of R.A. Fisher. We will focus on Fisher’s three favorite modes of statistical inference: significance tests, likelihood, and fiducial probability. We’ll examine how his theory of estimation and how his approach to the design of experiments are linked through Fisher information. Also, we’ll consider several attempts made after 1960 to extend Fisher’s ideas, including efforts to make it more-Bayesian in some ways (relating to the techniques Fisher advocated in the Behrens-Fisher solution), and ideas to make it less Bayesian in other ways (relating to using interval probability, as in H.E.Kyburg’s Epistemological Probability theory and in Dempster-Shafer theory).

80-516 Seminar on Causation
Fall
This course explores the foundations of causation. It examines how causal claims connect to both probability and to counterfactuals. Under a variety of background assumptions, and a variety of senses of “reliable”, we will examine which causal inferences can be made reliably. We will also examine recent developments in statistics and artificial intelligence relating to causal inference.

80-518 Seminar on Topics in Logic
Intermittent
Research seminar for graduate students, focussed on homotopy type theory.

80-520 Seminar on Philosophy Science
Intermittent: 9 units
Seminar on Philosophy of Science: Evolutionary Game Theory and Applications. Evolutionary game theory (EGT) represents one potential foundational theory which grounds traditional game theory models. EGT relaxes the “high rationality” assumptions of traditional game theory in favor of conceptualizing individuals as subject to evolution by natural selection or some form of trial and error learning. EGT provides a justification for many of the traditional concepts in game theory, but also highlights potential problems with this theory. This course will provide an overview of evolutionary game theory, and then will investigate two applications of that theory. The first application is the explanation of pro-social behaviors including cooperation, fairness, and altruism. The second application is to the emergence of linguistic behaviors, especially in non-human animals.
Prerequisites: 80-413 or 80-713.

80-521 Seminar on Formal Epistemology
Spring
Formal epistemology applies systematic mathematical models from logic, statistics, and computability theory to provide fresh perspectives on traditional epistemological questions regarding the nature of epistemic justification, vagueness, paradoxes of knowing, paradoxes of rationality, the nature of bounded rationality, and the connection between coherence, epistemic justification and truth. The course will critically examine published papers, many of which were presented at the Formal Epistemology Workshop in recent years.

80-522 Seminar on the Foundation of Statistics
Fall: 9 units
The seminar focuses on some single important foundational work, or body of work, and investigates related research from a contemporary point of view. For example, when Savage’s Foundations of Statistics is the course’s focus, the class goals include understanding how Bayesian decision theory differs from its rivals, and understanding where Savage’s position is located within the current Bayesian program. Other seminal thinkers whose writings have served as the course’s focus in different terms include, R.A.Fisher, Harold Jeffreys, J.Neyman, and A. Wald. Prerequisites: This is primarily a graduate level class. Instructor permission is required for undergraduates.

80-530 Seminar on Ethical Theory
Intermittent
The guiding theme of the seminar will be on the nature of empirically informed ethics and the connection between the descriptive and the normative. After a brief introduction to views on empirically informed ethics, we will examine the issue in more depth by focusing on a particular topic that has received much attention in the empirical literature: the notion of perspective in moral judgments and behavior. We will spend part of the course examining self/other differences (“me” vs. “you”) and part of the course examining group membership (“us” vs. “them”). We will look at recent empirical work on how our perspective influences our moral judgments and behavior and what the implications of this work are for normative, metaethical, and prescriptive questions and vice versa. How should we evaluate moral judgments and behavior? Can we tell whether a judgment or behavior is ?biased? or ?better? or ?worse? than another? What normative and metaethical considerations are relevant to addressing these questions? How should information about how we tend to judge and behave in moral situations inform our metaethical, normative, and prescriptive ethical accounts?

80-575 Seminar on Metaphysics
Intermittent
We will begin, appropriately, with readings from Plato and from Aristotle’s Metaphysics, which motivate the fundamental questions of metaphysics. With this classical background, we will turn to a range of exemplary contemporary articles concerning such traditional metaphysical questions as the nature of existence, necessity, and causation, the persistence of objects through time, and personal identity. This is an advanced undergraduate class.

80-580 Seminar on the Philosophy of Language
Intermittent: 9 units
Seminar on the Philosophy of Language: The Construction of Meaning. The prevailing standard model of linguistic interpretation traces back to the work of Paul Grice. On Grice’s model, the interpretation of a linguistic utterance is a two stage process. First, an interpreter calculates the meaning of the sentence uttered on the basis of the conventional meanings of the words and syntactic constructions used. The output of this compositional process is assumed to be a proposition. Then, the interpreter proceeds to make inferences, based on this proposition and other contextual information, as to what the speaker meant. Crucially, this process (a) treats the truth conditional content of sentences as compositionally determinable on the basis of purely linguistic information and (b) clearly separates the contribution of semantic processes and pragmatic (inferential) ones. This standard picture has been critiqued from a variety of perspectives, and there is an ongoing debate surrounding the theory of the construction of meaning. Some philosophers and linguists have argued that inferential processes indeed do contribute to the truth-conditional content, or “what is said.” Others defend some version of the standard view, and have provided a variety of responses to critiques. Both kinds of view come in different degrees, ranging from extreme contextualists to those who deny that inference interpretation provide insight into the actual meanings of sentences. In this seminar, we will read the literature in which this debate has been and is being carried out. Readings will primarily be drawn from the philosophical and linguistic literature, with some forays into psycholinguistics and computational linguistics.

80-595 Senior Thesis
Fall and Spring

80-602 Philosophy Core Seminar II
Spring
This course surveys contemporary philosophical issues by discussing a different set of journal articles each week. Frequently the discussion focuses on the work of faculty from the department, from nearby universities, or from visiting scholars. Discussions are often moderated by the person whose work is being discussed. The course therefore provides an opportunity for graduate students to explore potential areas of interest and to foster contact with potential thesis or dissertation advisors. This course is required for first year graduate students. Advanced undergraduates may participate only with the permission of the instructor.
80-618 Topics in Logic I
Spring: 6 units
The course first provides a basic introduction to fundamental concepts of computability through Turing’s machines, Gödel's equational calculus, and Kleene’s m-recursive functions. Using an equivalent approach via Post’s canonical production systems, basic undecidability results are then established, in particular, the undecidability of first-order logic. Finally, Gödel’s Incompleteness Theorems are proved for subsystems of Zermelo’s set theory in an “abstract” version that takes for granted representability and derivability conditions. The mathematical presentation is supplemented by historical and philosophical remarks.

80-619 Topics in Logic II
Spring: 6 units
This is an advanced continuation of 80-618. In a first step, the Incompleteness Theorems are proved now for elementary number theory; that requires the “arithmetization” of syntactic concepts and the coding of sequences within number theory. Then, Normal Form Theorems for intuitionist and classical first-order natural deduction systems are established and seen to be useful for automated proof search. Finally, Gentzen’s first consistency proof for elementary number theory is presented. Again, the mathematical discussion is supplemented by historical and philosophical remarks.

80-689 Natural Language Syntax
Fall: 12 units
This course is intended to provide an introduction to the methods of syntactic analysis, and to some major themes of contemporary syntactic theory, following up on syntactic concepts introduced in 80180, Nature of Language. A primary theme of the course is the structural constituency of a sentence, and the course will address some of the following questions. What are syntactic constituents? Do all aspects of syntax manipulate the same kinds of structural units, or do different grammatical processes rest on incompatible notions of constituency? How do other syntactic relations connect with constituent structure? To the extent that there is mismatch between different notions of syntactic structure, how can it be reconciled within a theory of grammar? These questions are engaged in through the diagnostics and techniques of modern syntactic analysis and argumentation. Those tools will allow us to explore the striking ways in which syntactic theory unifies diverse grammatical phenomena in terms of a common notion of phrase structure. The course complements 80280, Linguistic Analysis, building on but not presupposing syntactic analyses developed in that class.

80-698 Natural Language Syntax
Fall: 9 units
This course is intended to provide an introduction to the methods of syntactic analysis, and to some major themes of contemporary syntactic theory, following up on syntactic concepts introduced in 80180, Nature of Language. A primary theme of the course is the structural constituency of a sentence, and the course will address some of the following questions. What are syntactic constituents? Do all aspects of syntax manipulate the same kinds of structural units, or do different grammatical processes rest on incompatible notions of constituency? How do other syntactic relations connect with constituent structure? To the extent that there is mismatch between different notions of syntactic structure, how can it be reconciled within a theory of grammar? These questions are engaged in through the diagnostics and techniques of modern syntactic analysis and argumentation. Those tools will allow us to explore the striking ways in which syntactic theory unifies diverse grammatical phenomena in terms of a common notion of phrase structure. The course complements 80280, Linguistic Analysis, building on but not presupposing syntactic analyses developed in that class.

80-715 Seminar on Homotopy Type Theory
Intermittent
tba.

80-818 Seminar on Topics in Logic
Intermittent
TBD.

80-830 Seminar on Ethical Theory
Intermittent
The guiding theme of the seminar will be on the nature of empirically informed ethics and the connection between the descriptive and the normative. After a brief introduction to views on empirically informed ethics, we will examine the issue in more depth by focusing on a particular topic that has received much attention in the empirical literature: the notion of perspective in moral judgments and behavior. We will spend part of the course examining self/other differences (“me” vs. “you”) and part of the course examining group membership (“us” vs. “them”). We will look at recent empirical work on how our perspective influences our moral judgments and behavior and what the implications of this work are for normative, metaethical, and prescriptive questions and vice versa: How should we evaluate moral judgments and behavior? Can we tell whether a judgment or behavior is biased? or better? or worse? than another? What normative and metaethical considerations are relevant to addressing these questions? How should information about how we tend to judge and behave in moral situations inform our metaethical, normative, and prescriptive ethical accounts?

80-850 TBA
Fall
To be determined.