

**821. Advanced General Pharmacology**  
Winter. 3(2-2) PHM 520, PHM 820;  
PHM 521 or concurrently.

This course complements PHM 521 (Pharmacodynamics) with increased coverage of toxicology, chemotherapy (antibiotic, anticancer, and antiparasitic) and central nervous system drugs, including narcotic analgesics and psychoactive agents.

**827. Neurobiology**

Fall. 4(4-0) Approval of department. Interdepartmental with the departments of Physiology and Zoology. Administered by the Department of Zoology.

Neural structure and function at cellular and intercellular levels. Membrane and synaptic potentials, receptor transduction, and intracellular transport with an introduction to comparative and evolutionary aspects.

**839. Systems Neuroscience**

Winter of odd-numbered years. 5(4-2) Approval of department. Interdepartmental with the departments of Anatomy and Physiology. Administered by the Department of Anatomy.

Physiology, anatomy and pharmacology of sensory, somatomotor and autonomic neural systems.

**841. Advanced Endocrine Physiology and Pharmacology**

Fall of odd-numbered years. 5(5-0) PSL 500E or approval of course coordinator. Interdepartmental with and administered by the Department of Physiology.

Basic and advanced physiologic and pharmacologic concepts of general endocrinology including reproductive endocrinology.

**870. Problems**

Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Limited amounts of individual work on selected research problems for first year graduate students in the Department of Pharmacology and Toxicology.

**899. Master's Thesis Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department. Individual work on research problems for the master's degree in pharmacology.

**910. Seminar**

Fall, Winter, Spring. 1(1-0) May reenroll for a maximum of 3 credits. Approval of department.

Discussion of recent topics on pharmacology by departmental or outside speakers, or reporting of research efforts by graduate students of the Department of Pharmacology and Toxicology.

**980. Problems**

Fall, Winter, Spring, Summer. 2 to 5 credits. May reenroll for a maximum of 20 credits. Approval of department.

Limited work on selected research problems.

**999. Doctoral Dissertation Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Individual work on research problems for the doctoral degree in pharmacology.

**PHILOSOPHY PHL**

**College of Arts and Letters**

Each of the courses PHL 101, PHL 102, PHL 103 is an independent gateway to a major area of philosophy. Together they provide a comprehensive introduction to philosophical inquiry.

The courses may be taken independently and in any order.

**101. Introduction to Philosophy: Ethics and Value (A)**

Fall, Winter, Spring, Summer. 3(3-0) Students may not receive credit for both PHL 101 and PHL 330.

An inquiry into the nature of the right and the good, addressed to such fundamental problems as the objectivity of moral judgments, the criteria of right and wrong, and the grounds of moral responsibility.

**102. Introduction to Philosophy: Knowledge and Reality (A)**

Fall, Winter, Spring, Summer. 3(3-0)

An examination of such basic philosophical problems as free will and determinism, the existence of God, the relation of mind and body, and the scope and limits of human knowledge.

**103. Introduction to Philosophy: Logic**

Fall, Winter, Spring, Summer. 3(3-0)

An examination of deductive and inductive reasoning and of such topics as rational argumentation, fallacies, definition, meaning, truth, and evidence. Designed to improve students' capacities to read and think critically.

**120. Classics of Philosophical Literature (A)**

Fall, Winter, Spring. 4(4-0)

An introduction to contrasting classics of literary and philosophical importance. Primary texts from such philosophers as Plato, Lucretius, Descartes, Hume, Nietzsche, James, Russell and Sartre will be read and discussed.

**200H. Honors Work**

Fall, Winter, Spring. 1 to 16 credits. Approval of department.

Taken together, PHL 211, PHL 212 and PHL 213 provide a comprehensive introduction to the history of western philosophy. It is recommended that these courses be taken in sequence. However, if only one course is taken it may be any one of these, since each course is self-contained and may be taken independently of the others.

**211. Ancient Philosophy (A)**

Fall, Winter, Spring. 3(3-0)

An introduction to the history of philosophy: the Greek and Roman periods, with emphasis on Plato and Aristotle.

**212. Medieval and Early Modern Philosophy (A)**

Winter, Spring. 3(3-0) PHL 211 recommended.

An introduction to the history of philosophy: the Middle Ages to the rise of modern science, with emphasis on Aquinas, Descartes, Spinoza and Leibniz.

**213. Modern Philosophy (A)**

Fall, Spring. 3(3-0) PHL 212 recommended.

An introduction to the history of philosophy: the Enlightenment to the nineteenth century, with emphasis on Hume and Kant and such other philosophers as Locke, Berkeley, Hegel, Kierkegaard and Nietzsche.

**312. Chinese Philosophy**

Spring. 3(3-0)

Comparative moral philosophy of Confucianism, Taoism, and Buddhism and their metaphysical and cultural roots. Concepts of enlightenment and human nature.

**315. American Philosophy**

Spring of odd-numbered years. 3(3-0) Three credits in philosophy or approval of department.

Examination of such thinkers as Royce, Pierce, James, Dewey, Whitehead and Santayana, illustrating classic American contributions to philosophy.

**323. Existentialism**

Fall, Winter, Spring. 3(3-0) Three credits in philosophy or approval of department.

Such authors as Husserl, Jaspers, Kierkegaard, Marcel, Nietzsche, Sartre and such topics as hope, anxiety, bad faith, subjectivity, freedom, social being, and phenomenological method.

**330. Elements of Ethics**

Fall, Winter, Spring. 3(3-0) Juniors. Students may not receive credit for both PHL 101 and PHL 330.

An inquiry into the nature of the right and the good, addressed to such fundamental problems as the objectivity of moral judgments, the criterion of right and wrong, and the grounds of moral responsibility.

**337. Logic I**

Fall, Winter, Spring. 4(4-0)

Modern symbolic methods in deductive reasoning. The logic of compound and general sentences.

**338. Logic II**

Winter, Spring. 4(4-0) PHL 337 or approval of department.

The logic of identity, functions and definitions. The axiomatic method and its applications.

**340. Moral Problems in Medicine and the Life Sciences**

Fall, Winter, Spring. 4(4-0) Juniors.

Philosophical aspects of euthanasia, allocation of scarce medical resources, experimentation and informed consent, truth-telling and the doctor-patient relationship, genetic counseling, genetic engineering, behavior control, and health care delivery.

**341. Philosophical Aspects of Feminism**

Fall, Winter, Spring. 4(4-0)

Conceptual issues in feminist theory. Such concepts as oppression, sexism and chauvinism, feminist separatism, rape, respect and self-respect, personhood, power and control and feminism will be analyzed and explored.

**342. Philosophy of the Counter Culture**

Fall. 3(3-0)

Students will examine counter cultural critiques of contemporary culture and values; and develop, articulate, defend their own views on such issues, especially as those issues immediately affect their own lives.

**Descriptions — Philosophy  
of  
Courses**

**343. Ethical Issues in the Social Sciences**  
Winter. 3(3-0)

Philosophical treatment of ethical issues arising from the social scientists' conflicting obligations to their subjects, science, profession, career, personal values and society.

**344. Ethical Issues in Nursing**  
(PHL 461.) Winter. 2(2-0) PHL 340 or approval of instructor.

Application of ethical analysis, principles, and reasoning to such topics as parentalism, truthfulness, coercion, confidentiality, and autonomy in the nursing context.

**345. Business Ethics**  
Fall. 4(4-0) Juniors. Interdepartmental with General Business—Business Law Programs.

Ethical dimensions of the relationships between a business and employees, consumers, other businesses, society, government, and the law. Readings from philosophical and business sources.

**350. Philosophy of Art**  
Fall, Winter, Spring. 3(3-0) Three credits in philosophy or 6 credits in art, music, or literature.

Inquiry into the principles of artistic activity made with a view to determining the conditions under which art is produced, the nature of its product, and the sources of its value.

**355. Philosophy of Religion**  
Spring. 3(3-0) Three credits in philosophy or 6 credits in religious studies or approval of department.

Alternative philosophical approaches to religion as a personal and/or social phenomenon. Contemporary problems of meaning, evidence and obligation in relation to religious beliefs and practices.

**360. Philosophy of Law**  
Fall, Winter, Spring. 3(3-0) Three credits in philosophy or 6 credits in political science or approval of department.

Philosophic examination of such legal concepts as punishment, responsibility, rights and duties, judicial decisions and justice, and such legal theories as natural law, positivism and realism.

**361. Philosophy of Technology**  
Winter. 4(4-0) Sophomores or approval of department. Interdepartmental with and administered by Lyman Briggs School.

Is our technology desirable? Are its social forms desirable? What alternatives are there? Students will develop and defend their own appraisals of technology.

**365. Social and Political Philosophy**  
Fall, Winter. 3(3-0) Three credits in philosophy or 6 credits in political science, or approval of department.

Philosophical justifications for political authority and individual liberty. Consideration of such theories as natural law, social contract, utilitarianism and historicism.

**366. The Philosophy of Karl Marx**  
Spring. 4(4-0) Three credits in philosophy or approval of department.

Structural and critical analysis of Karl Marx's philosophical thought. Theory of objectification and alienation; its application to the religious, philosophical, political, social, and economic spheres; reform of the Hegelian dialectic.

**370. Philosophy of Language**  
Fall. 3(3-0) Three credits in philosophy or approval of department.

An elucidation of elementary topics in semantics and philosophy of language, including such topics as meaning, denotation and truth.

**380. The Nature of Science**  
Fall, Winter. 3(3-0) One course in the biological, physical or mathematical sciences.

Conflicting views about science. Such topics as: scientific methodology, the objectivity of science, the presuppositions, goals and limits of science.

**381. Science, Values, and Decision Making**  
Winter, Spring. 3(3-0) One course in the biological, physical or mathematical sciences.

Conflicting views of science and values. Such topics as: the value neutrality of science, science and ideology, science and decision making, the scientific predictability of human actions.

**390. Philosophy in Literature (A)**  
Spring. 3(3-0) Juniors.

Philosophical problems found in such writers as Goethe, Dostoevsky, Tolstoy, Mann, Hesse, Camus.

**400H. Honors Work**  
Fall, Winter, Spring. 1 to 5 credits. May reenroll for a maximum of 10 credits. Approval of department.

Individually selected program of supervised group or individual study dealing with some phase of philosophy.

**410. Plato**  
Fall. 4(4-0) PHL 211 or 9 credits in philosophy or approval of department.

The most important Socratic dialogues, including the "Republic" and the dialogues of the early Academy.

**411. Aristotle**  
Winter. 3(3-0) PHL 211 or PHL 410 or 9 credits in philosophy or approval of department.

Introduction to the philosophy of Aristotle. Readings from the texts of Aristotle and lectures on his philosophy with emphasis on his logical, epistemological and metaphysical inquiries.

**412. Aristotle's Moral and Political Philosophy**  
Spring of even-numbered years. 3(3-0) PHL 211 or PHL 411 or 9 credits in philosophy or approval of department.

Such topics as: happiness as the supreme good; practical virtue and the middle way; morality as rational; political foundations; the social role of women, children, and slaves.

**413. Continental Rationalism**  
Fall of odd-numbered years. 4(4-0) PHL 212 or 9 credits in philosophy or approval of department.

The rationalists of the seventeenth century, with emphasis on Descartes, Spinoza and Leibniz.

**414. Medieval Philosophy**  
Spring of odd-numbered years. 4(4-0) PHL 211 or PHL 212 or PHL 411 or 9 credits in philosophy or approval of department.

Significant philosophers and philosophical problems of the Medieval period.

**416. British Empiricism**  
Fall of even-numbered years. 4(4-0) PHL 212 or PHL 213 or 9 credits in philosophy or approval of department.

The development of the philosophical school of British Empiricism, with emphasis on the writings of Locke, Berkeley, and Hume.

**419. Nineteenth Century Philosophy**  
Fall. 4(4-0) PHL 213 or PHL 423 or 9 credits in philosophy or approval of department.

Significant philosophical developments in 19th century thought, with emphasis on post-Kantian idealism.

**420. Twentieth Century Analytic Philosophy**  
Fall. 4(4-0) Three credits in philosophy at the 300 level or higher or 9 credits in philosophy or approval of department.

Issues in the works of such philosophers as Frege, Moore, Wittgenstein, Carnap, Quine, Goodman, Austin, Strawson, and Kripke.

**423. Kant**  
Winter. 4(4-0) PHL 213 or 9 credits in philosophy or approval of department.

Kant's metaphysical and epistemological system as expressed in the "Critique of Pure Reason."

**424. Contemporary Continental Philosophy**  
Winter. 4(4-0) Three credits of philosophy at the 300 level or higher or approval of department.

Typical areas of study are phenomenology, structuralism, contemporary interpretation of Marx, hermeneutic (Gadamer), critique of instrumental reason (Horkheimer, Adorno, Habermas) ontologies of the person.

**427. Hegel**  
Spring. 4(4-0) PHL 213 or PHL 423 or 9 credits in philosophy or approval of department.

Introduction to Hegel's dialectic and system through selections from major texts. The problem of historically concrete philosophy and implications for science, politics, art, and religion.

**428. Special Topics in Existentialism**  
Spring. 4(4-0) PHL 323 or approval of department.

An examination of existentialist thought in terms of a single author or topic.

**431. Modern Ethical Theories**  
Fall. 4(4-0) 3 credits in philosophy at the 300 level or higher or approval of department.

Study of some of the important writers and problems in moral philosophy since the seventeenth century.

**432. Contemporary Ethical Theories**  
Winter. 4(4-0) PHL 431 or 9 credits in philosophy or approval of department.

Study of some of the leading contemporary views of the nature of moral language and consciousness.

**434. Aesthetic Theory and Modernism**  
Fall. 4(4-0) Juniors. Interdepartmental with History of Art, Linguistics and Oriental and African Languages, Romance Languages, the Department of English, and the School of Music.

Problems, assumptions, and arguments of modern aesthetic theory examined in the context of debates over modernity and modernist artistic practice.

**436. Philosophical Logic**

Winter. 4(4-0) May reenroll for a maximum of 8 credits if different topic is taken, PHL 337 or approval of department.

Such topics as metatheory, model theory, artificial intelligence and deviant logics, e.g., logic of existence, intuitionist logic, many valued logic.

**440. Epistemology**

Fall of even-numbered years. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy or approval of department.

Study of evidence, grounds of assent, conviction, belief, and certainty.

**445. Metaphysics**

Fall of odd-numbered years. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy or approval of department.

Fundamental concepts and categories in metaphysics: substance, process, cause, universal, particular, space, time, endurance, eternity, change, and value.

**447. Philosophy of Mind**

Winter, Spring. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy or approval of department.

Examines classical and contemporary treatments of such concepts as "mind", "self", "intentionality", "mental act", and associated problems (the body-mind relation, "thinking" machines, the connection of thought with action, etc.).

**460. Moral and Political Issues**

Fall, Spring. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy, or approval of department.

Philosophical aspects of such issues as freedom of speech and action, civil disobedience, violence, war, justice and equality, human rights and punishment.

**480. The Nature of Scientific Theory and Explanation**

Winter. 4(4-0) PHL 337 or approval of department.

Topics such as: the logical structure of scientific theories, empirical meaningfulness and testability, deductive and probabilistic explanation, prediction.

**481. Foundations of Scientific Inference**

Spring. 4(4-0) PHL 337 or approval of department.

Topics such as: discovery vs. validation of theories, probability, induction and confirmation theory.

**484. Philosophy of Biological Sciences**

Spring. 4(4-0) Nine credits in science or approval of department. Interdepartmental with and administered by Lyman Briggs School.

Methodological notions and problems of the biological sciences such as: observation and measurement, classification, teleological and functional explanation, teleological systems, emergentism, vitalism, value neutrality.

**485. Philosophy of the Social Sciences**

Spring. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy or 9 credits, other than basics, in social science or approval of department.

Selected problems in the methodology of the behavioral sciences, including such topics as: concept formation and theory construction, explanation and insight, subjectivity and value judgements, emergence and teleology, historicism, reductionism, measurement, and statistical inference.

**490. Individual Reading**

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Supervised reading on a particular author or topic.

**494. Special Topics (MTC)**

Fall, Winter, Spring. 2(2-0) to 6(6-0) May reenroll for a maximum of 12 credits if different topics are taken. Approval of department.

Intensive study of some particular problem or author in philosophy.

**495. Proseminar**

Winter, Spring. 1 credit. May reenroll for a maximum of 4 credits. Juniors. Fifteen credits in philosophy or approval of instructor.

Each section will examine a particular topic or author. Emphasis on discussion of student papers.

**805. Business Ethics**

Spring. 4(4-0) Graduate student in the College of Business or approval of instructor. Interdepartmental with General Business—Business Law Programs.

Ethical dimensions of such topics as corporate responsibility, preferential hiring, profit and taxation, deception and bribery, self-regulation versus government regulation, "whistleblowing", and advertising. Readings from philosophical and business sources.

**825. Seminar in the History of Philosophy**

Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**830. Seminar in Ethics**

Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**837. Seminar in Logic**

Fall. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**841. Seminar in Epistemology**

Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**845. Seminar in Metaphysics**

Fall, Winter, Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**860. Seminar in Social Philosophy**

Spring. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Philosophy of law and of the state.

**870. Seminar in the Philosophy of Language**

Fall. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Concrete bases of language and nature of meaning.

**880. Seminar in Philosophy of Science**

Fall, Winter. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

**890. Graduate Reading Course**

Fall, Winter, Spring, Summer. 1 to 10 credits. May reenroll for credit. Approval of department.

Supervised reading course for advanced graduate students for more thorough investigation of special fields.

**899. Master's Thesis Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**999. Doctoral Dissertation Research**

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**PHYSICAL SCIENCE PHS**

**College of Natural Science**

The content of 405, as well as the problems course, 890, may vary from term to term. Brochures giving detailed information about individual courses are available in the College of Natural Science and the Office of the Assistant Dean for Lifelong Education. These courses are primarily designed for in-service teachers and interested adults and are offered in off-campus locations.

**203. Foundations of Physical Sciences**

Fall, Winter, Spring, Summer. 4(3-3) 12 credits of Natural Science.

An introduction to physical science for non-science majors. Emphasis on basic concepts relating to human interaction with the physical environment. Topics selected from physics, chemistry, and the earth and space sciences.

**405. Topics in Physical Science**

Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits if different topic is taken. Approval of department.

Presentation of single topics from the physical sciences by senior faculty and guest lecturers. Topics are selected to facilitate development of strong physical science programs in schools.

**890. Problems in Physical Science**

Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 15 credits. Bachelor's degree in a physical science.

**PHYSICS AND ASTRONOMY**

**College of Natural Science**

**Physics**

Introductory physics courses are offered in both the lecture-recitation and the Competency-Based-Instructional (CBI) format. In the latter format the students are carefully guided through each course via written materials with ample consulting time available. Both content and pace of course are flexible to suit student's needs and interests, final grades being based on total amount of material for which student's mastery is certified. The introductory courses may be grouped by the application of two criteria: The interests of the students the courses are designed to serve and the method of instruction employed.

**PHY**