555. Veterinary Pharmacology and Toxicology
Winter. 5(4-2) PHM 554.
Endocrine, autacoid and central nervous system pharmacology; chemotherapy; antimicrobials, antihelminthics, antineoplastics.

552. Clinical Pharmacology Studies
Fall, Winter, Spring, Summer. 3(2-0) PHM 520 or approval of instructor.
Cases in clinical pharmacology.

594. Veterinary Toxicology
(V M 594) Spring. 4(4-0) Ninth-term Veterinary Medicine students.
Pharmacological basis and pathological features of diseases of animals caused by common toxic chemicals with emphasis on clinical manifestations, diagnosis, prevention, and treatment.

810. Synaptic Transmission
Spring of odd-numbered years. 4(4-0) Approval of department.
Chemical and electrical aspects of nervous impulse transmission at synaptic and neuroeffector junctions and influences of drugs upon these processes. Intracellular neuronal circuitry; ionic flux; thalamus; neocortex; cerebellum.

811. Cardiac Pharmacology
Winter of even-numbered years. 4(4-0) PHM 555 or PHM 521; PSL 501, approval of department.
Effects of drugs on normal physiological and biochemical processes in cardiac cells. Emphasis is placed on cell electrophysiology and ion flux.

814. Advanced Principles of Toxicology
Spring of even-numbered years. 4(4-0) PHM 521 or PHM 553.
Current biochemical and physiological mechanisms of toxicity in major organ systems. Mechanisms of mutagenicity, carcinogenicity and teratology.

819. Principles of Drug Tissue Interactions
Summer. 5(4-2) Approval of department.
Drug absorption, distribution, metabolism and excretion; drug-receptor interactions including methods for assessing receptor number and affinity; dose response relationships; pharmacokinetics; altered drug sensitivity and response; toxicology.

820. Drug Actions, Effects and Uses I
Fall. 5(4-2) PHM 819.
Mechanisms of intracellular and extracellular signalling. Effects of therapeutic and toxic agents on cells of the cardiac, renal and autonomic nervous systems. Uses of therapeutic agents and important investigative chemicals.

821. Drug Actions, Effects and Uses II
Winter. 5(4-2) PHM 819, PHM 820.
Effects of therapeutic and toxic agents on cells of endocrine and central nervous systems. Autacoid pharmacology. Chemotherapy of infectious and neoplastic diseases. Uses of therapeutic agents and important investigative chemicals.

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

102. Introduction to Philosophy: Knowledge and Reality (A)
Fall, Winter, Spring, Summer. 3(2-0)
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(2-0)
An examination of deductive and inductive reasoning and of such topics as rational argumentation, fallacies, definitions, 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(2-0)
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.

212. 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.

322. 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.

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
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.

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 process and procedure, 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, 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 enroll 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 right 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 rationalism of the seventeenth century, with emphasis on Descartes, Spinoza and Leibniz.

414. Medieval Philosophy
Spring of odd-numbered years. 4(4-0) PHL 212 or PHL 412 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 in 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 dialectical and systematic through selections from major texts. The problem of historically concrete philosophy and implications for science, politics, art, and religion.
428. Special Topics in Existentialism
Fall, 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 Language, 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 6 credits if different topic is taken. PHL 357 or approval of department.
Such topics as metaphysics, modal 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.
Examinations on classical and contemporary theories 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.).

450. Introduction to Cognitive Science
Winter. 4(4-0) PHL 447 or PSY 300 or LIN 401 or CPS 441 or approval of department.
Interdepartmental with Linguistics and the Department of Psychology.
The cognitive processing of information by animals, humans, and computers. Relevant issues in philosophy, psychology, linguistics, neurophysiology, and artificial intelligence.

451. 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.

454. Philosophy of Biological Sciences
Spring. 4(4-0) Nine credits in science or approval of department.
Interdepartmental with and administered by Lamont 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.

455. Philosophy of the Social Sciences
Spring. 4(4-0) Three credits in philosophy at 300 level or higher or 9 credits in philosophy 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.

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 and prediction.

484. Philosophy of Biological Sciences
Spring. 4(4-0) Nine credits in science or approval of department.
Interdepartmental with and administered by Lamont 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 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.

505. 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 responsibilities, 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.

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.

880. Seminar in Social Philosophy
Spring. 2 to 4 credits.
May reenroll for a maximum of 12 credits. Approval of department.

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 a maximum of 24 credits. 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. Variable credit. Approval of department.

999. Doctoral Dissertation Research
Fall, Winter, Spring. Variable credit. Approval of department.

PHYSICAL SCIENCE

College of Natural Science
The College of Natural Science
The content of 405, as well as the problems course, 883, may vary from term to term. Brochures giving detailed information about individual courses are available in the College of Natural Science. These courses are primarily designed for in-service teachers and interested adults and are offered in off-campus locations.