

**910 Seminar**  
Fall, Spring. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to graduate students. Approval of department.

Discussion of recent topics in pharmacology and toxicology by faculty or invited outside speakers. Students research reports.

**980 Problems**  
Fall, Spring, Summer. 2 to 5 credits. A student may earn a maximum of 20 credits in all enrollments for this course. R: Open only to graduate students. Approval of department.

Limited work in selected research projects.

**999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 50 credits in all enrollments for this course. R: Open only to graduate students in the Department of Pharmacology and Toxicology. Approval of department.

Doctoral dissertation research.

**330 Formal Reasoning**  
Fall, Spring. 4(4-0)  
Formal methods in deductive reasoning. Logic of connectives and quantifiers including identity, functions, and descriptions.

**340 Ethics**  
Fall, Spring. 3(3-0) RB: One PHL course.  
Inquiry through the writings of some important theorists, their critics and their contemporary followers. Aristotle, Hume, Kant, Mill, Sidgwick.

**344 Ethical Issues in Health Care**  
Fall, Spring. 4(4-0) R: Not open to freshmen or sophomores.  
Termination of treatment, truth-telling, informed consent, human experimentation, reproductive issues, allocation of scarce resources, justice and the health care system.

**345 Business Ethics**  
Fall. 4(4-0) R: Not open to freshmen or sophomores.  
Ethical dimensions of the relationships between a business and employees, consumers, other businesses, society, government, and the law.

**347 Aesthetics**  
Fall. 3(3-0) RB: One course in art or literature or music or philosophy.  
Theories of aesthetic value and the nature of art. Works of such aestheticians as Plato, Hume, Kant, Hegel, Tolstoy, Santayana, Wittgenstein, Isenberg, Langer, Murdoch.

**350 Introduction to Social and Political Philosophy**  
Fall. 3(3-0) RB: One PHL course.  
History of social and political philosophy; problems such as obligation, power, oppression, freedom, equality, and community.

**354 Philosophy of Law**  
Fall, Spring. 3(3-0) RB: One PHL course or two PLS courses.  
Legal concepts such as punishment, responsibility, rights and duties, and judicial decisions. Legal theories such as natural law, positivism and realism.

**355 Philosophy of Technology**  
Spring. 4(4-0) Interdepartmental with Lyman Briggs School. Administered by Lyman Briggs School. P:M: Completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors in Lyman Briggs School or the Department of Philosophy.  
Examination of the desirability of technology, its social forms, and its alternatives. Conventional productivist, ecological progressive, and radical humanist outlooks.

**356 Philosophical Aspects of Feminism**  
Fall, Spring. 4(4-0) RB: One PHL course.  
Conceptual and normative issues in feminist theory. Topics such as sexism, oppression, coercion, control, power, equality, personhood, respect and self-respect, rape, separatism, community, intimacy, and autonomy.

**357 Philosophy of Karl Marx**  
Spring. 3(3-0) RB: One PHL course.  
Marx's philosophical thought and its bearing on science, religion, art and politics.

**360 Philosophy of Language**  
Spring. 3(3-0) RB: One PHL course.  
Elementary topics in semantics, linguistic pragmatics, and philosophy of language. Meaning, denotation, speech acts, and linguistic relativity.

**380 Nature of Science**  
Fall, Spring. 3(3-0) RB: One course in the biological, physical, or mathematical sciences.  
Conflicting views about science and values. Such topics as scientific methodology; the objectivity and value neutrality of science; the presuppositions, goals, and limits of science; and science and decision making.

**410 Plato**  
Fall. 4(4-0) RB: (PHL 210) or two other PHL courses.  
Selection from Plato's dialogues including political and ethical theory, aesthetics, epistemology, and metaphysics.

**411 Aristotle**  
Spring. 4(4-0) RB: (PHL 210 or PHL 410) or two other PHL courses.  
Aristotle's major works and his major contributions to the sciences, metaphysics, ethics, and politics.

**413 Continental Rationalism**  
Fall of odd years. 4(4-0) RB: (PHL 211) or two other PHL courses.  
Rationalists of the seventeenth century, with emphasis on Descartes, Spinoza and Leibniz.

**414 British Empiricism**  
Fall of even years. 3(3-0) RB: (PHL 211) or two other PHL courses.  
The philosophy that strives to trace all our ideas and beliefs, whether in science, morality, or religion, back to their source in experience. Emphasis on the works of Locke, Berkeley, and Hume.

**415 Kant**  
Spring. 4(4-0) RB: (PHL 211) or two other PHL courses.  
Kant's metaphysical and epistemological system, focusing on his 'Critique of Pure Reason'.

**416 Hegel**  
Spring of even years. 4(4-0) RB: (PHL 211 or PHL 415) or two other PHL courses.  
Hegel's dialectic and its bearing on both the history of philosophy and issues about science, politics, art and religion.

**417 19th Century Philosophy**  
Fall. 4(4-0) RB: (PHL 210 or PHL 211) or two other PHL courses.  
Emphasis on attempts to overcome the limits on human knowledge postulated by Kant. Works by writers such as Fichte, Schopenhauer, Nietzsche, and James.

**418 Topics in 20th-Century Analytical Philosophy**  
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: One PHL course at the 300 level or above.  
Issues in the works of such philosophers as Frege, Russell, Moore, Wittgenstein, Carnap, Quine, Austin, and Kripke.

**420 Topics in 20th-Century Continental Philosophy**  
Fall. 4(4-0) A student may earn a maximum of 12 credits in all enrollments for this course. RB: One PHL course at the 300 level or above.  
Recent European movements such as phenomenology, poststructuralism, critical theory, hermeneutics, and philosophical anthropology.

## PHILOSOPHY PHL

### Department of Philosophy College of Arts and Letters

**130 Logic and Reasoning**  
Fall, Spring. 3(3-0) Not open to students with credit in PHL 330.  
Deductive and inductive reasoning. Topics such as rational argumentation, fallacies, definition, meaning, truth and evidence. Techniques for critical reading and thinking.

**200 Introduction to Philosophy**  
Fall, Spring. 3(3-0)  
Theories of knowledge, values, and reality. Topics such as objectivity, relativism and cultural diversity, moral responsibility, aesthetic values, the self, existence of God, free will, minds and machines.

**210 Ancient Greek Philosophy**  
Fall. 3(3-0)  
Philosophical problems of existence, knowledge, and action as addressed in selected readings from the Presocratics, Plato, Aristotle, and Hellenistic philosophers.

**211 Modern Philosophy**  
Spring. 3(3-0) RB: (PHL 210)  
Philosophy from the Renaissance through the nineteenth century, including Descartes, Spinoza, Locke, Hume, Kant, Hegel, Kierkegaard and Nietzsche.

**320 Existentialism**  
Fall. 3(3-0) RB: One PHL course.  
Husserl, Jaspers, Kierkegaard, Marcel, Nietzsche, Sartre, and de Beauvoir. Topics such as hope, anxiety, bad faith, subjectivity, freedom, social being, phenomenological method.

## Philosophy—PHL

- 421 Topics in European Philosophy**  
Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: One PHL course at the 300 level or above.  
A particular problem, topic, or author in nineteenth- and twentieth-century European philosophy, such as Kierkegaard, Husserl, Heidegger, Lukacs, Marxism vs. existentialism, and theories of interpretation.
- 431 Topics in Philosophy of Logic and Language**  
Spring of even years. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. RB: PHL 330, MTH 472, PHL 360, or LIN 437 SA: PHL 430  
Investigation of logical concepts. Philosophical significance of twentieth-century results in logic. Related issues in the semantics and pragmatics of natural language.
- 432 Logic and its Metatheory**  
Spring of odd years. 4(4-0) RB: (PHL 130)  
Not open to students with credit in PHL 330.  
Logical consequence, first-order predicate logic with identity, including functions and descriptions. Proof theory and model theory. Topics in metatheory such as completeness, compactness, and the Lowenheim-Skolem Theorems. The axiomatic method and Godel's Incompleteness Theorems.
- 440 Central Issues in Ethics**  
Spring. 4(4-0) RB: (PHL 340 or PHL 350)  
Twentieth-century discussions of universalization, utilitarianism, nature of a moral theory, moral language, relativism, skepticism, theory and practice, weakness of will, moral education, and justification.
- 444 Philosophical Issues in Biomedicine**  
Fall of even years. 4(4-0) RB: (PHL 200 and PHL 344)  
Philosophically puzzling features of medical research, policy, and practice. Issues in theories of knowledge, personal identity, reference and meaning.
- 450 Liberal Theory and Its Critics**  
Spring of even years. 3(3-0) RB: PHL 350 and one other course in PHL  
Main contemporary figures in the liberal tradition and their critics.
- 451 Philosophy and the Black Experience**  
Spring of odd years. 3(3-0) RB: PHL 340 or PHL 350 or PHL 450  
Philosophical issues about race and the black experience. Nature of racism, relationship of science to race, debates about identity, public policy and race.
- 452 Ethics and Development**  
Fall. 3(3-0) RB: Should have taken either two courses in philosophy or three courses in relevant social science fields.  
Ethical issues such as racism, health care disparities, war, genocide, famine, agricultural intensification, economic liberalization, democratization, gender equity, globalization, and environmental degradation.
- 456 Topics in Feminist Philosophy**  
Fall of odd years. 4(4-0) RB: PHL 356 or WS 401 or two 400-level courses in PHL.  
Philosophical issues in a framework of feminist politics and critique. Standpoint theories, care/justice ethics, ontological status of genders/races, theories of power/dominance, determinism/freedom.
- 460 Epistemology**  
Fall. 3(3-0) RB: One PHL course at the 300 level or above.  
Theories and concepts of knowledge, belief, epistemic justification, certainty, and reason.
- 461 Metaphysics**  
Spring. 3(3-0) RB: One PHL course at the 300 level or above.  
Basic concepts employed in trying to understand the nature of things. Concepts include universals, particulars, things, kinds, properties, events, persons, change, causality, chance, existence, possibility, necessity, space, and time.
- 462 Philosophy of Mind**  
Fall. 3(3-0) RB: One PHL course at the 300 level or above.  
Modern theories of the mind, other minds, and the mind's relation to the body. Theories include dualism, behaviorism, criteriology, reductive and eliminative materialism, and functionalism.
- 463 Introduction to Cognitive Science**  
Spring. 3(3-0) Interdepartmental with Linguistics; Psychology. Administered by Department of Linguistics and Germanic, Slavic, Asian and African Languages. RB: (PHL 462 or LIN 401 or CSE 440 or PSY 200)  
Cognitive processing of information by animals, humans, and computers. Relevant issues in philosophy, linguistics, psychology, neurophysiology, and artificial intelligence.
- 474 Aesthetic Theory and Modernism**  
Fall. 4(4-0) Interdepartmental with English; History of Art; Linguistics and Languages; Music; Romance Languages. R: Not open to freshmen or sophomores.  
Problems, assumptions, and arguments of modern aesthetic theory examined in the context of debates over modernity and modernist artistic practice.
- 480 Philosophy of Science**  
Fall. 4(4-0) RB: (PHL 330) or a 200 level mathematics or statistics course.  
Structure of scientific theories and explanation. Causation, prediction, induction, confirmation, discovery, and scientific progress.
- 484 Philosophy of Biological Science**  
Spring. 3(3-0) RB: Three courses in biological science or two PHL courses.  
Philosophical and methodological issues in biology. Topics such as functional explanation, classification, the structure of evolutionary theory, reductionism, observation and measurement, or value-neutrality.
- 485 Philosophy of Social Science**  
Spring. 3(3-0) RB: Three courses in social science or two PHL courses.  
Explanations, theories, and concepts in social science. Topics such as historicism; reductionism; rationality and relativism; comparison of logical empiricist, interpretive, and critical theory approaches.
- 486 Biotechnology in Agriculture: Applications and Ethical Issues**  
Fall of even years. 3(3-0) Interdepartmental with Horticulture; Crop and Soil Sciences; Forestry. Administered by Department of Horticulture. P:M: (BOT 105 or BS 111) RB: (CSS 350 or ZOL 341) R: Not open to freshmen or sophomores.  
Current and future roles of biotechnology in agriculture: scientific basis, applications. Environmental, social, and ethical concerns.
- 490 Independent Study**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Approval of department.  
Supervised special projects arranged by an individual student and a faculty member in areas supplementing regular course offerings.
- 491 Special Topics in Philosophy**  
Fall, Spring, Summer. 3 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.  
Special topics supplementing regular course offerings, proposed by faculty on a group study basis.
- 492 Seminar for Majors (W)**  
Fall. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. P:M: Completion of Tier I writing requirement. RB: 16 credits in Philosophy. R: Open only to juniors or seniors in the Department of Philosophy or approval of department.  
Advanced, variable topic seminar for undergraduate majors. Seminar presentations. Substantial paper.
- 499 Senior Thesis Research (W)**  
Fall, Spring. 3(3-0) P:M: Completion of Tier I writing requirement. R: Open only to juniors or seniors in the Department of Philosophy. Approval of department.  
Individual research project supervised by a faculty member that demonstrates the student's ability to do independent research and submit or present a major paper.
- 800 Proseminar in Philosophy**  
Fall. 3(3-0) R: Open only to master's students in the Department of Philosophy or approval of department.  
The practice of graduate and professional work in philosophy: reading, writing, presentation, critique and revision; rigor of argument and clarity of expression; areas and methods of inquiry; cooperation and dialogue in inquiry; conferences, professional activities, and employment.
- 801 Teaching Philosophy**  
Spring. 3(3-0) R: Open only to Ph.D. students in Philosophy or approval of department.  
Theoretical and pedagogical issues in teaching philosophy: the nature of philosophy, designing a course and syllabus, lecturing, leading discussions, designing assignments, evaluation, classroom dynamics, using technology, teaching various areas of philosophy.
- 810 Seminar in the History of Philosophy**  
Fall. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Major thinkers, themes, periods, or movements in the history of philosophy.
- 820 Seminar in Continental Philosophy**  
Fall of even years. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Major figures or themes in 19th and 20th century continental philosophy.

- 840 Seminar in Value Theory**  
Spring. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Major figures, themes, or periods in ethics or aesthetics. Topics vary.
- 850 Seminar in Social and Political Philosophy**  
Spring of even years. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Major figures, themes, or periods in social and political philosophy. Topics vary.
- 860 Seminar in Metaphysics and Epistemology**  
Fall. 2 to 4 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Selected topics in metaphysics, epistemology, and philosophy of mind.
- 867 Nature and Practice of Cognitive Science**  
Spring. 3(3-0) Interdepartmental with Zoology; Psychology; Linguistics; Computer Science and Engineering. Administered by Department of Zoology. RB: Undergraduate course work in behavioral biology, cognitive psychology, philosophy, linguistics, or artificial intelligence.  
Survey of how different disciplines explore the cognitive processes underlying intelligent behavior.
- 870 Seminar in Philosophy of Health Care**  
Fall. 2 to 4 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Ethical, political, theoretical, and methodological issues in medicine and health care.
- 880 Seminar in Philosophy of Science**  
Spring. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in Philosophy or approval of department.  
Selected topics in the philosophy of the special sciences, in the metatheory of science, and in the social studies of science.
- 890 Independent Study**  
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 20 credits in all enrollments for this course. R: Approval of department.  
Special projects, directed reading, and research arranged by an individual graduate student and a faculty member in areas supplementing regular course offerings.
- 894 Practicum in Philosophy of Health Care**  
Fall, Spring. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: (PHL 344) R: Open only to graduate students in Philosophy or approval of department.  
Study of ethical and policy issues in hospital and governmental agency settings.

- 899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.  
Directed research leading to a master's thesis in partial fulfillment of Plan A master's degree requirements.
- 999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 75 credits in all enrollments for this course. R: Approval of department.  
Doctoral dissertation research.

## PHYSICAL MEDICINE PMR AND REHABILITATION

### Department of Physical Medicine and Rehabilitation College of Osteopathic Medicine

- 590 Special Problems**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
Each student works under faculty direction on an experimental, theoretical or applied problem in physical medicine and rehabilitation.
- 601 Physical Medicine and Rehabilitation Clerkship**  
Fall, Spring, Summer. 2 to 12 credits. Fall: Michigan Capital Med. Spring: Michigan Capital Med. Summer: Michigan Capital Med. A student may earn a maximum of 12 credits in all enrollments for this course.  
Physical medicine and rehabilitation inpatient and ambulatory setting clinical experience, didactic sessions, case documentation and presentation, hospital rounds. Strong emphasis on evaluation of neuromusculoskeletal disorders and treatment of function deficits.
- 620 Directed Studies**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to juniors or seniors in the College of Osteopathic Medicine. Completion of Semester 6 in the graduate-professional program.  
Individual or group projects on special problems related to physical medicine and rehabilitation.
- 806 Advanced Neuroscience Techniques Laboratory**  
Spring. 3(0-9) Interdepartmental with Neuroscience; Psychology; Pharmacology and Toxicology; Radiology. Administered by Program in Neuroscience. RB: (PHM 827) R: Open only to doctoral students in the Neuroscience major.  
Methods and underlying principles of neuroscience research.

## PHYSICS

## PHY

### Department of Physics and Astronomy College of Natural Science

- 101 Concepts in Physics**  
Fall. 1(1-0)  
Conceptual foundations of physics emphasizing key experiments.
- 102 Physics Computations I**  
Spring. 1(0-3) P:M: (PHY 183 or concurrently or PHY 183B or concurrently or PHY 193H or concurrently or PHY 181B or concurrently) RB: (CSE 101 or CSE 231)  
Use of Mathematica to solve, analyze and graph equations and data from mechanics.
- 170 Investigations in Physics**  
Fall. 3(0-6) R: Approval of department.  
Experiments in optics, electronics, sound and mechanics; analysis of data using computers, library research and oral presentations.
- 181B Basic Physics I**  
Fall, Spring, Summer. 3 credits. P:M; (MTH 132 or MTH 152H or LBS 118) Not open to students with credit in LBS 271 or PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231B or PHY 231C, PHY 233B.  
Newton's laws of motion, conservation of momentum and angular momentum, energy conservation, thermal physics, waves, and sound. This course is given in the competency based instruction format.
- 182B Basic Physics II**  
Fall, Spring, Summer. 3 credits. P:M: (PHY 183 or PHY 183B or PHY 181B or LBS 271 or PHY 193H) or (PHY 231 or concurrently and PHY 233B) or (PHY 231B or concurrently and PHY 233B) and (MTH 133 or MTH 153H or LBS 119) Not open to students with credit in LBS 272 or PHY 184 or PHY 184B or PHY 232 or PHY 232B or PHY 294H.  
Electricity and magnetism, optical phenomena, interference and diffraction of light, atomic and subatomic topics. This course is given in the competency based instruction format.
- 183 Physics for Scientists and Engineers I**  
Fall, Spring. 4(5-0) P:M: (MTH 132 or MTH 152H or LBS 118) Not open to students with credit in LBS 164 or PHY 181B or PHY 183B or PHY 193H or PHY 231 or PHY 231B.  
Mechanics, Newton's laws, momentum, energy conservation laws, rotational motion, oscillation, gravity, waves.
- 183A Physics I**  
Fall, Spring, Summer. 1 credit. P:M: (PHY 181B) Not open to students with credit in LBS 271 or PHY 183 or PHY 183B or PHY 193H or PHY 231 or PHY 231B or PHY 231C.  
Topics from: frames of reference, special relativity, rocket equation, forced oscillations, resonances, fluid motion, numerical solutions, moments of inertia, gyroscopic motion. This course plus PHY 181B is equal to PHY 183B. This course is given in the competency based instruction format.