

6710. Analytical Systems II (Post 1900). 3 hours. Examination of analytical systems in the 20th century. Prerequisite(s): MUTH 5370, and MUMH 5010 or 5020 (current enrollment is acceptable), or equivalent.

6900-6910. Special Problems. 1–3 hours each.

Music/Education

see Music

Music/Laboratories

see Music

Musiology, Music History and Literature

see Music

Nuclear Engineering Technology

see *Undergraduate Catalog*

Philosophy and Religion Studies

Philosophy, PHIL

5110. Seminar in the Theory of Knowledge. 3 hours. Analysis of the essential problems involved in the theory of knowledge, including some of the classical answers to important epistemological problems.

5250. Seminar in the Philosophy of Natural Science. 3 hours. A study of the nature, limits and significances of physics, chemistry, biology and related sciences with emphasis on the similarities and contrasts between scientific and other modes of knowing.

5260. Seminar in Philosophy of Social Science. 3 hours. Questions on explanations, observable human purposes and science of valuation. Contrasting science, ideology and occultism. Darwinism as conceptual scheme. The “causal” status of symbols and verbal behavior. Debates about objectivity, Verstehen, phenomenology and behaviorism, referring to K. Popper, G. Nettle, L.A. White, B.F. Skinner, C. Geertz, T. Kuhn, P. Winch and M. Weber.

5315. Topics in Ancient Philosophy. 3 hours. An examination of some major problem areas in the history of ancient Western philosophy — for example: concepts of nature, concepts of the character and function of knowledge, concepts of the nature and extent of value. Major thinkers normally covered include Plato and Aristotle.

5335. Topics in Modern Philosophy. 3 hours. An examination of some major problem areas in the history of modern Western philosophy — for example: concepts of nature, concepts of the character and function of knowledge, concepts of the nature and extent of value. Major thinkers covered can include Descartes, Spinoza, Locke, Hume and Kant.

5410. Seminar in Ethical Theory. 3 hours. An examination of a variety of ethical theories and their application in applied situations.

5450. Seminar in the Philosophy of Ecology. 3 hours. Traces the evolution of ecology from its roots in 19th-century natural history through general ecology, restoration ecology, human ecology and mathematical ecology. Also explores the sociocultural contexts in which ecology emerged and now exists, including the so-called second scientific revolution and the two-culture split.

5451. Environmental Ethics. 3 hours. Examination of basic positions in the field of environmental ethics with emphasis on legal and moral rights for nature, animal liberation, and Western philosophical and religious traditions.

5600. Philosophy of Religion. 3 hours. Examination of arguments for and against the existence of a deity; meaning of concepts of religion, evil, good and worship; impact of religious beliefs and commitments on social and moral life.

5670. Natural History and Philosophy of Rivers. 6 hours. (3;5) Ecological, geological and philosophical history of arid watersheds of the western United States. Extended field trip required. Desert canyons are geologically unique and present wonderful opportunities to study interactions of geology, fauna, flora, environment, cultural development and environmental ethics. Prerequisite(s): consent of instructor. (Same as BIOL 5670.)

5700. Seminar in Environmental Ethics. 3 hours. An intensive analysis of new positions in environmental ethics with special emphasis on their theoretical value as a contribution to contemporary philosophy and their practical value with regard to environmental policy and decision making.

5710. Ecofeminism: Women's Studies and Environmental Ethics. 3 hours. Examines the merger of feminism with environmental ethics and its subsequent evolution. Subject matter includes the analysis of patriarchy, gender issues and multicultural perspectives within the larger framework of ethical responses to ecocrisis.

5720. Comparative Environmental Ethics. 3 hours. An exploration of resources for environmental philosophy in non-Western traditions, focusing on India but including Taoist and Buddhist traditions.

5730. Western Religion and the Environment. 3 hours. A historic and contemporary overview of Euro-American religious thought concerning the environment, including investigation of the ancient Western religions, Judaism, Christianity and Native American religions.

5750. Environmental Ethics and Public Policy. 3 hours. Investigates the policy turn in environmental philosophy, exploring ways to make environmental ethics/philosophy more relevant to decision-makers, public agencies and stakeholders groups. Explores the emerging field of humanities policy, which claims that our problems (environmental or otherwise) are to a significant degree humanistic in nature and that part of the theoretical work of humanists consists of devising ways to integrate their research with the concerns of policymakers.

5800. Seminar in Symbolic Logic and Metamathematics. 3 hours. Review of the history, development and present status of symbolic logic and metamathematics, including a consideration of the problems encountered in the philosophical interpretation of logical concepts.

5900-5910. Special Problems. 1–3 hours each. Prerequisite(s): consent of department.

5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on the thesis has begun. May be repeated for credit.

5960. Seminar in Problems of Philosophy. 3 hours. Intensive analysis of major philosophical issues against the background of classical and contemporary investigations. May be repeated for credit.

6100. Aesthetics. 3 hours. Examination of principles of value and aesthetics proposed by representative artists and philosophers.

6120. Social and Political Philosophy. 3 hours. Examination of the relation among philosophical ideas and community, natural rights, justice, freedom and authority.

6350. Metaphysics. 3 hours. Examination of problems that arise from attempts to give an account of reality and its manifestations: possibility and necessity, causality, the nature of events, mind-body and universals.

6620. Existentialism. 3 hours. Examination of the place of man in the world and his relation to problems of authenticity, anxiety and forlornness. Kierkegaard, Nietzsche, Heidegger and Sartre.

6900-6910. Special Problems. 1–3 hours. Research by doctoral students in fields of special interest. Prerequisite(s): consent of department.

6950. Doctoral Dissertation. 3, 6, 9 hours. To be scheduled only with consent of department. 12 hours required. No credit assigned until dissertation has been completed and filed with the graduate dean. Doctoral students must maintain continuous enrollment in this course subsequent to passing qualifying examination for administration for admission to candidacy. May be repeated for credit.

6960. Seminar in Problems in Philosophy. 3 hours. Intensive analysis of major philosophical issues against the background of classical and contemporary investigations. May be repeated for credit as topics vary.

equation, one-dimensional problems, operators and eigenfunctions, three-dimensional problems, angular momentum and spin.

5510. Quantum Mechanics II. 3 hours. Scattering theory; spin, angular momentum; WKB and variation method; time-independent and time-dependent perturbation theory; identical particles; applications; relativistic waves equations. Prerequisite(s): PHYS 5500.

5610. Selected Topics in Modern Physics. 3 hours. Selected topics of contemporary interest in physics. Prerequisite(s): consent of department. May be repeated for credit as topics vary with consent of department chair.

5700. Computational Physics. 3 hours. Symbolic and numerical solutions to single and multiple, single-variable and multi-variable, linear and nonlinear, integral and differential equations. Finite-differences method for solving a partial differential equation. Solution visualization techniques, including multidimensional plots. Matrix manipulation. Data analysis. Monte Carlo methods. Random walk simulations. Classical trajectory simulations.

5710. Advanced Classical Mechanics I. 3 hours. Variational principles and Lagrange's equations. Central force problem. Rigid body motion. Hamilton's equations; canonical variables and transformations; action-angle variables; Hamilton-Jacobi theory. Prerequisite(s): PHYS 3220 or consent of department.

5720. Electromagnetic Theory I. 3 hours. Maxwell's equations, vector, scalar potentials; gauge transformations; wave equation; conservation theorems; boundary conditions; statics. Non-dissipative media and dispersion; dissipative media; reflection and refraction; guided waves. Prerequisite(s): PHYS 4210 and 6000 (concurrent), or consent of department.

5750. Selected Topics in Materials Physics. 3 hours. Topics from specialized areas of materials science, physics, chemistry. Integrated circuit fabrication and materials. Transmission electron microscopy. May be repeated for credit as topics vary.

5900-5910. Special Problems. 1–6 hours each. Special problems in advanced physics for graduate students. Problem chosen by the student with the approval of the supervising professor and the department chair.

5920-5930. Research Problems in Lieu of Thesis. 3 hours. An introduction to research; may consist of an experimental, theoretical or review topic.

5940. Seminar in Current Literature of Physics. 1–3 hours. Reports and discussion one hour a week. Required each term/semester of all graduate students in physics.

5941. Colloquium. 1 hour. Weekly lectures by faculty and invited guests on topics of current interest in contemporary physics.

5950. Master's Thesis. 3 or 6 hours. To be scheduled only with consent of department. 6 hours credit required. No credit assigned until thesis has been completed and filed with the graduate dean. Continuous enrollment required once work on thesis has begun. May be repeated for credit.

5960-5970. Science Institute. 1–6 hours each. For students accepted by the university as participants in special institute programs. May be repeated for credit, not to exceed a total of 6 hours in each course. Laboratory fee required.

Physical Education

see *Undergraduate Catalog*

Physics

Astronomy – see *Undergraduate Catalog*

Physics, PHYS

5450. Survey of Solid State Physics. 3 hours. A course designed to acquaint the student with the major areas of solid state physics. Simple models and physical insight to solid state phenomena are stressed. Intended for physics students of all specializations. Topics include crystal structure, crystal symmetry, reciprocal lattice, X-ray diffraction, crystal binding, phonons and lattice vibrations, thermal properties, free electron theory, semiconductors, superconductivity and magnetic properties. Prerequisite(s): PHYS 4110.

5500. Quantum Mechanics I. 3 hours. Fundamentals of quantum theory. Foundations of wave mechanics, wavepackets and the uncertainty principles. Schroedinger