Department of Logic and Philosophy of Science

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Overview
The Department of Logic and Philosophy of Science (LPS) brings together faculty and students interested in a wide range of topics loosely grouped in the following areas: general philosophy of science; philosophy of the particular sciences; logic, foundations and philosophy of mathematics; and philosophy of mathematics in application. LPS enjoys strong cooperative relations with UCI’s Department of Philosophy; in particular, the two units jointly administer a single graduate program which offers the Ph.D. in Philosophy. LPS also has strong interconnections with several science departments, including Mathematics and Physics, as well as the Francisco J. Ayala School of Biological Sciences, the Donald Bren School of Information and Computer Sciences, the Departments of Cognitive Sciences and Economics, and the graduate concentration in Mathematical Behavioral Sciences. The Program in Law and Graduate Studies is a concurrent degree study leading to a J.D. from the School of Law in conjunction with a Ph.D. in the Department of Logic and Philosophy of Science.

Graduate Program
Ph.D. in Philosophy
The Department of Logic and Philosophy of Science and the Department of Philosophy jointly administer a Ph.D. program in Philosophy with two independent tracks: the Philosophy track and the LPS track. Both tracks begin from a common core of requirements in standard philosophical fields (e.g., history of philosophy, logic, ethics, metaphysics/epistemology) and branch off thereafter; both tracks offer the Ph.D. in Philosophy. Applicants are advised to apply to the unit whose faculty areas of specialization and curriculum correspond best with their interests. Students are expected to reside in the same unit as their primary advisor, but faculty in both units are available for all other academic purposes (course work, independent studies, committee membership, and more). See the Department of Philosophy in the School of Humanities for a description of the Philosophy track.

The M.A. in Philosophy may also be awarded to Ph.D. students who complete the necessary requirements.

Admissions
Applicants for the LPS track must have a bachelor’s degree, but there is no formal requirement as to the field of that degree. The most natural undergraduate majors for LPS graduate students would be philosophy, mathematics or the sciences, but those with other degrees who are interested in the LPS fields should feel free to apply.

Complete applications must include GRE scores, transcripts, letters of recommendation and a writing sample. The deadline for application is December 1.

Several forms of incoming fellowships are available on a competitive basis; these include a stipend, student fees, tuition and nonresident supplemental tuition (for out-of-state students). In subsequent years, some additional fellowship funding is available, but students in good standing are most often supported with teaching assistantships.

Requirements of the LPS Track
All required courses must be completed with a grade of B or better.

The History of Philosophy Requirement provides a broad perspective. Graduate courses in three out of the following four areas—Modern Rationalism, Modern Empiricism, Kant, and Twentieth Century—must be completed by the end of the seventh quarter in residence.

The Logic Requirement acquaints students with the fundamentals of modern logic: elementary set theory, metalogic, effective procedures and Gödel’s incompleteness theorems. LPS 205A, LPS 205B, and LPS 205C must be completed by the end of the seventh quarter in residence.

The Field Requirement provides exposure to a range of philosophical disciplines. One graduate course in moral philosophy and one graduate course in metaphysics/epistemology must be completed by the end of the seventh quarter in residence. (These courses may not also be used to satisfy the History Requirement.)

The Philosophy of Science Requirement provides exposure to a range of philosophy of science, from general philosophy of science to the philosophies of particular sciences (e.g., physics, biology), to the philosophies of mathematics and logic. Three selected courses from LPS 240–247 must be completed by the end of the seventh quarter in residence. (These courses may be repeated as topics vary.) Courses used to satisfy the Philosophy of Science Requirement may also be used to satisfy the History or Field Requirements.

The Tools of Research Requirement provides some flexibility for students with various levels of interest in pursuing the philosophy of a particular science. So, for example, a student most interested in historical issues in the philosophy of mathematics might benefit most from the study of German, while a student most interested in the philosophy of quantum mechanics should take a series of graduate courses in physics. (Students wishing to
specialize further in the philosophy of a particular science might wish to pursue more demanding options; see the Emphases in Mathematics, Physics, and Biology and the Behavioral Sciences, below.) To satisfy this requirement, a student must pass an examination on an appropriate foreign language or receive a grade of B or better in three appropriate graduate courses in a discipline or disciplines outside philosophy by the end of the ninth quarter in residence. Though the discipline(s) here must be outside philosophy, they might be taught by Philosophy or LPS faculty. The two-hour language examination will be administered by an LPS faculty member and will require the student to translate (with the aid of a dictionary) a passage or passages from philosophical or scientific authors.

The Portfolio Requirement ensures that students have acquired dissertation-level skills in the writing of philosophy: e.g., the ability to isolate, understand and evaluate arguments in the philosophical literature; the ability to assimilate secondary literature; the ability to formulate and defend an original philosophical thesis. The portfolio is designed to display these skills. To satisfy this requirement, a student must submit an extended writing sample, most often consisting of several individual papers, that demonstrates the skills necessary to write a Ph.D. dissertation. (A successful portfolio typically consists of several papers totaling around 80 pages. These may be revisions of term papers. Each paper should present and defend a definite thesis and should be accessible to faculty members unfamiliar with the literature in question. The papers in the portfolio need not be of publishable quality, but they must, collectively, demonstrate the specified skills.) Portfolios will be evaluated by the entire LPS faculty. (LPS track students may request that relevant Philosophy Department faculty also be present at the evaluation meeting.) Portfolios must be submitted by the end of the fourth week of the seventh quarter.

The Candidacy Examination demonstrates that the student has a viable dissertation topic and an adequate grasp of related literature. To satisfy this requirement, a student must prepare and be examined on a reading list of canonical literature in the area of the dissertation and a brief (15–20 page) dissertation proposal. The reading list should in effect define the context of the proposed dissertation. The examination must be completed by the end of the tenth quarter in residence. The normative time for advancement to candidacy is 3.3 years.

Dissertation Defense. Students must pass a final oral examination focusing on the content of the dissertation administered by the Dissertation Committee. The normative time for completion of the Ph.D. is six years, and the maximum time permitted is seven years.

LPS Track Emphasis in Mathematics
In addition to the LPS track described above, students may elect to pursue the more demanding option of the Mathematics emphasis. Faculty in the UCI and UCLA Departments of Mathematics participate in the Mathematics emphasis. Students in the emphasis take courses and receive advising from these participating Mathematics professors, as well as from the faculty of LPS and the Philosophy Department. Mathematics emphasis students must satisfy the following requirement in addition to the usual LPS track requirements:

Mathematics Requirement
A student must receive a grade of B or better in six graduate courses in mathematics. (Though the courses here are in mathematics, some might be taught by LPS faculty. They may also be used to satisfy the Tools of Research requirement.)

LPS Track Emphasis in Physics
In addition to the LPS track described above, students may elect to pursue the more demanding option of the Physics emphasis. Physics emphasis students must satisfy the following requirement in addition to the usual LPS track requirements:

Physics Requirement
A student must receive a grade of B or better in three sections of LPS 241, as well as in three additional graduate courses in Physics or Mathematics. (Though the courses here are in physics or mathematics, they might be taught by LPS faculty. They may also be used to satisfy the Tools of Research requirement, but not the Philosophy of Science requirement.)

LPS Track Emphasis in Biology and the Behavioral Sciences
In addition to the LPS track described above, students may elect to pursue the more demanding option of the Emphasis in Biology and the Behavioral Sciences. Emphasis students must satisfy the following requirement in addition to the usual LPS track requirements.

Biology/Behavioral Sciences Requirement
A student must receive a grade of B or better in six graduate courses, each of which is in biology or the behavioral sciences. (In some cases, with the approval of the student’s advisor and the DGS, courses taught by LPS faculty may satisfy the emphasis requirements. Emphasis courses may also be used to satisfy the Tools of Research requirement, but not the Philosophy of Science requirement.)

4+1 M.A. Degree in Philosophy, Political Science and Economics (PPE)
The goal of this program is to train students in three critically important and related approaches to understanding the social world around us. Philosophy develops analytic rigor and trains students to reason logically. Political Science provides an understanding of how institutions impact modern societies and helps students evaluate the choices that such institutions regularly make. And economics is the study of how individuals, firms, and governments make decisions which together determine how resources are allocated. An appreciation of economics has increasingly become crucial for an understanding of institutional policy making. The objective of the M.A. in PPE is to prepare students for careers in government, law, private or public corporations, and non-profit organizations.

In order to be admitted to the program, undergraduate students must submit an application in the winter quarter of their third year. More information on the application process can be found on the LPS Department Graduate Program website (http://www.lps.uci.edu/grad/ppe.php). The program of study
can be divided into three stages: pre-requirements that must be met for admission into the program, undergraduate requirements to be completed before the end of the fourth year, and graduate requirements to be completed by the end of the fifth year.

**Pre-Requirements**
- MATH 2A and MATH 2B.
- Advancement toward completing a B.A. in one of the associated disciplines.
- Three introductory courses in two of the associated disciplines that are not the student's major. A list of approved courses can be found on the LPS Department Graduate Program website (http://www.lps.uci.edu/grad/ppe.php).

**Undergraduate Requirements**
- Completion of a B.A. in one of the associated disciplines.
- Six additional courses (with at least two upper-division in the two disciplines that are not the student's major, with three courses in each discipline (these courses must be approved by the director of the PPE program).

**Graduate Requirements**
- Complete ECON 203A.
- Proseminar in PPE I, II, II.
- Six graduate courses approved by the director of the PPE program, two in each of the three areas.

The normative time to degree is four years in undergraduate study and one additional year as graduate students. A full description of the program can be found on the LPS Department Graduate Program website (http://www.lps.uci.edu/grad/ppe.php).

**Salzburg Exchange Program**
LPS and the Department of Philosophy jointly administer an Exchange Program with the University of Salzburg. The program has two parts. The Scholarly Exchange provides opportunities for faculty and graduate students in LPS and Philosophy to visit Salzburg and for faculty and graduate students from Salzburg to visit one or the other of the UCI units. The Program also sponsors joint conferences, held alternately in Irvine and in Salzburg; these are co-sponsored by Salzburg and the UCI Interdisciplinary Program in the History and Philosophy of Science.

To be eligible for the Salzburg Exchange, a graduate student must have advanced to candidacy. The selected student spends one semester in Salzburg, usually teaching one course in the general area of the thesis topic. An upper-division course may be taught in English, but lower-division courses must be taught in German. (Some previous visitors have learned serviceable German by attending a Goethe institute during the preceding summer.) Typically, a Salzburg visitor will receive a Salzburg Fellowship intended to cover travel expenses, and a stipend; those who teach while in Salzburg will also receive a salary intended to cover living expenses (including health and dental insurance).

Applications from LPS graduate students (including a curriculum vita and syllabi for courses that might be taught) should be sent to the LPS Salzburg Exchange Director by November 1.

**Program in Law and Graduate Studies (J.D./Ph.D.)**
Highly qualified students interested in combining the study of law with graduate research and/or professional qualifications in Logic and Philosophy of Science are invited to undertake concurrent degree study under the auspices of UC Irvine’s Program in Law and Graduate Studies (PLGS). Students in this program pursue a coordinated curriculum leading to a J.D. degree from the School of Law in conjunction with a Ph.D. degree in the Department of Logic and Philosophy of Science. Contact the PLGS Program Director’s office for additional information at 949-824-4158, or by email to plgs@law.uci.edu. A full description of the program, with links to all relevant application information, can be found at the School of Law Concurrent Degree Programs website (http://www.law.uci.edu/academics/interdisciplinary-studies/concurrent-degrees.html) and in the School of Law School section of the Catalogue.

**Faculty**
Francisco J. Ayala, Ph.D. Columbia University, *Donald Bren Professor and University Professor of Ecology and Evolutionary Biology; Logic and Philosophy of Science; Religious Studies*

Jeffrey A. Barrett, Ph.D. Columbia University, *Professor of Logic and Philosophy of Science; Philosophy*

Jean-Paul Carvalho, Ph.D. Oxford University, *Associate Professor of Economics; Logic and Philosophy of Science*

Matthew Foreman, Ph.D. University of California, Berkeley, *Professor of Mathematics; Logic and Philosophy of Science* (ergodic theory and dynamical systems, logic and foundations)

Steven A. Frank, Ph.D. University of Michigan, *Donald Bren Professor of Ecology and Evolutionary Biology; Logic and Philosophy of Science*

Jeremy Heis, Ph.D. University of Pittsburgh, *Associate Professor of Logic and Philosophy of Science; Philosophy*
Donald D. Hoffman, Ph.D. Massachusetts Institute of Technology, Professor of Cognitive Sciences; Logic and Philosophy of Science (machine and human vision, visual recognition, artificial intelligence, virtual reality, consciousness and cognition, shape from motion)

Simon Huttegger, Ph.D. University of Salzburg, UCI Chancellor's Fellow and Associate Professor of Logic and Philosophy of Science

Kent E. Johnson, Ph.D. Rutgers, The State University of New Jersey, Associate Professor of Logic and Philosophy of Science; Linguistics

Arthur D. Lander, Ph.D. University of California, San Francisco, Donald Bren Professor and Professor of Developmental and Cell Biology; Biomedical Engineering; Logic and Philosophy of Science; Pharmacology (systems biology of development, pattern formation, growth control)

Penelope J. Maddy, Ph.D. Princeton University, UCI Distinguished Professor of Logic and Philosophy of Science; Mathematics; Philosophy (philosophy of mathematics and logic, meta-philosophy)

David B. Malament, Ph.D. The Rockefeller University, Professor Emeritus of Logic and Philosophy of Science

John Manchak, Ph.D. University of California, Irvine, Associate Professor of Logic and Philosophy of Science

Michael T. McBride, Ph.D. Yale University, Professor of Economics; Logic and Philosophy of Science; Religious Studies

James L. McGaugh, Ph.D. University of California, Berkeley, Research Professor and Professor Emeritus of Neurobiology and Behavior; Logic and Philosophy of Science

Richard Mendelsohn, Ph.D. Massachusetts Institute of Technology, Adjunct Professor of Logic and Philosophy of Science

Louis E. Narens, Ph.D. University of California, Los Angeles, Professor of Cognitive Sciences; Logic and Philosophy of Science (measurement, logic, metacognition)

Riley D. Newman, Ph.D. University of California, Berkeley, Professor Emeritus of Physics and Astronomy; Logic and Philosophy of Science; Physics and Astronomy

Cailin O'Connor, B.A. Harvard University, Assistant Professor of Logic and Philosophy of Science

Lisa Pearl, Ph.D. University of Maryland, College Park, Associate Professor of Cognitive Sciences; Linguistics; Logic and Philosophy of Science (linguistics, computational linguistics, language development, language change, Bayesian models)

Donald G. Saari, Ph.D. Purdue University, UCI Distinguished Professor of Economics; Logic and Philosophy of Science; Mathematics

Barbara W. Sarnecka, Ph.D. University of Michigan, Associate Professor of Cognitive Sciences; Logic and Philosophy of Science (cognitive development, language development, number concepts, conceptual change, individual cognitive development, historical development of science and mathematics)

Jonas Schultz, Ph.D. Columbia University, Professor Emeritus of Physics and Astronomy; Logic and Philosophy of Science

Brian Skyrms, Ph.D. University of Pittsburgh, UCI Distinguished Professor of Logic and Philosophy of Science; Economics; Philosophy

P. Kyle Stanford, Ph.D. University of California, San Diego, Professor of Logic and Philosophy of Science; Philosophy

Sean P. Walsh, Ph.D. University of Notre Dame, Associate Professor of Logic and Philosophy of Science; Linguistics; Mathematics (philosophy of mathematics, philosophy of logic and mathematical logic)

James O. Weatherall, Ph.D. Stevens Institute of Technology, Associate Professor of Logic and Philosophy of Science

Kai Wehmeier, Ph.D. University of Münster, Director, Center for the Advancement of Logic, Its Philosophy, History, and Applications and Professor of Logic and Philosophy of Science; Linguistics; Philosophy

Daniel Whiteson, Ph.D. University of California, Berkeley, Associate Professor of Physics and Astronomy; Logic and Philosophy of Science

Martin Zeman, Ph.D. Humboldt University of Berlin, Professor of Mathematics; Logic and Philosophy of Science (logic and foundations)
Courses

LPS 29. Critical Reasoning. 4 Units.

Same as PHILOS 29.

(II and Vb).

LPS 30. Introduction to Symbolic Logic. 4 Units.
An introduction to the symbolism and methods of the logic of statements, including evaluation of arguments by truth tables, the techniques of natural deduction, and semantic tableaux.

Same as PHILOS 30, LINGUIS 43.

(Vb)

LPS 31. Introduction to Inductive Logic. 4 Units.
Philosophical questions concerning the foundations of scientific inference, e.g., the traditional problem of induction, the Goodman paradox, the concept of cause, Mill's method of inductive reasoning, probability calculus, different interpretations of probability, and their interaction in inductive reasoning.

Same as PHILOS 31.

(II, Va)

LPS 40. The Nature of Scientific Inquiry. 4 Units.
Investigates the nature, scope, and status of scientific knowledge and the methods used to acquire it. Uses concrete historical examples from a variety of scientific fields to identify distinctive features of the scientific enterprise and explore their significance.

(II)

LPS 60. The Making of Modern Science. 4 Units.
Surveys the history of science and mathematics since the Scientific Revolution, examining central developments both chronologically and thematically, as well as investigating their significance for contemporary philosophical debates about the role and status of current scientific theories.

Same as HISTORY 60.

(GE II or GE IV).

LPS H80. Scientific Realism and Instrumentalism. 4 Units.
Explores competing views of the character and status of theoretical knowledge in science, including challenges to and defenses of the view that contemporary scientific theories offer straightforward and accurate descriptions of how things stand in otherwise inaccessible domains of nature.

Restriction: Campuswide Honors Program students only.

(II)

LPS H81. What is Space? 4 Units.
Historical, philosophical, scientific exploration of the concept of "space." Questions of interest include: What kind of a thing is space? How can we know what space is like? How is space different from time.

Restriction: Campuswide Honors Program students only.

(II)

LPS 91. The Philosophy of Sex. 4 Units.
Discusses the origins of biological sex, dynamics of sexual selection, sex differences in humans, and the construction of gender in human societies. Seeks to understand the role social values play in the creation of science.

Overlaps with LPS H91.

(III)
LPS H91. The Philosophy and Biology of Sex. 4 Units.
Covers the origins of biological sex, dynamics of sexual selection, the evolution and cultural creation of sexual behavior in humans, and the construction of gender in human societies.

Restriction: Campuswide Honors Program students only.

II and III.

LPS H95. Jurisprudence and Constitutional Law. 4 Units.
Applies competing theories of the nature of law and legal reasoning to evaluate decisions of the U.S. Supreme Court in controversial areas of constitutional law such as free speech, privacy, sexual conduct, affirmative action, and political campaign contributions.

Restriction: Campuswide Honors Program students only.

III.

LPS 100. Writing Philosophy. 4 Units.
Discussion of the aspects of writing that have special importance in philosophy; special philosophical terminology, techniques for evaluating arguments, philosophical definitions and philosophical theories. Requires at least 4,000 words of assigned composition based upon philosophical readings More detail, see file.

Same as PHILOS 100.

Restriction: Upper-division students only.

LPS 100W. Writing Philosophy. 4 Units.
Discussion of those aspects of writing of special importance in philosophy, e.g., philosophical terminology, techniques for evaluating arguments, philosophical definitions and theories. At least 4,000 words of assigned composition based on philosophical readings.

Prerequisite: Satisfactory completion of the Lower-Division Writing requirement.

Same as PHILOS 100W.

Restriction: Upper-division students only.

(Ib)

LPS 102. Introduction to the Theory of Knowledge. 4 Units.
A study of one or more of the basic issues in epistemology, e.g., the role of perception in the acquisition of knowledge, the nature of evidence, the distinction between belief and knowledge, and the nature of truth and certainty.

Same as PHILOS 102.

LPS 104. Introduction to Logic. 4 Units.
Introduction to sentence logic, including truth tables and natural deduction; and to predicate logic, including semantics and natural deduction.

Same as PHILOS 104, LINGUIS 142.

LPS 105A. Elementary Set Theory. 4 Units.
An introduction to the basic working vocabulary of mathematical reasoning. Topics include sets, Boolean operations, ordered n-tuples, relations, functions, ordinal and cardinal numbers.

Same as PHILOS 105A, LINGUIS 145A.

LPS 105B. Metalogic. 4 Units.
Introduction to formal syntax (proof theory) and semantics (model theory) for first-order logic, including the deduction, completeness, compactness, and Löwenheim-Skolem theorems.

Prerequisite: PHILOS 105A

Same as PHILOS 105B, LINGUIS 145B.
Overlaps with MATH 150.
LPS 105C. Undecidability and Incompleteness. 4 Units.
Introduction to the formal theory of effective processes, including recursive functions, Turing machines, Church's thesis, and proofs of Gödel's incompleteness theorem for arithmetic, and Church's undecidability theorem for first-order logic.

Prerequisite: PHILOS 105B
Same as LINGUIS 145C, PHILOS 105C.
Overlaps with MATH 152.
Concurrent with LPS 205C.

LPS 106. Topics in Logic. 4 Units.
Selected topics in mathematical or philosophical logic.

Prerequisite: PHILOS 105B or LPS 105B
Repeatability: Unlimited as topics vary.
Same as PHILOS 106.

LPS 108. Topics in Induction, Probability, and Decision Theory. 4 Units.
Selected topics in induction, probability, and decision theory.

Repeatability: Unlimited as topics vary.
Same as PHILOS 108.

LPS 113. Topics in Modern Philosophy. 4 Units.
Focuses on the works of central philosophical figures of modern Philosophy (e.g., Descartes, Leibniz, Hobbes, Locke, Hume, Kant) or on the treatment of one or more central philosophical problems by a number of these figures.

Repeatability: Unlimited as topics vary.
Same as PHILOS 113.

LPS 115. Topics in History of Analytic Philosophy. 4 Units.
Review of central theories or figures in the history of analytic philosophy. Emphasis on writings of Frege, Russell, Schlick, Carnap, and Quine. Topics include the nature of meaning and truth, the synthetic/analytic distinction, and scientific knowledge.

Repeatability: Unlimited as topics vary.
Same as PHILOS 115.

LPS 120. Topics in Metaphysics. 4 Units.
Examines central philosophical questions concerning our own fundamental nature and that of the world around us (e.g., causation and necessity, determination, free will, personal identity, the mind-body problem).

Repeatability: Unlimited as topics vary.
Same as PHILOS 120.

LPS 121. Topics in the Theory of Knowledge. 4 Units.
One or more topics in the theory of knowledge, e.g., the nature of rational justification, of perceptual knowledge, of a priori knowledge.

Repeatability: Unlimited as topics vary.
Same as PHILOS 121.

LPS H125. What Is Time?. 4 Units.
Engages the question "what is time?" by drawing on physics, philosophy, fiction, film, and psychology. Organized around understanding and addressing the tension between time as represented in physics and our immediate temporal experience.

Restriction: Campuswide Honors Program students only.

(III)
LPS 140. Topics in Philosophy of Science. 4 Units.
Selected topics in contemporary philosophy of science, e.g., the status of theoretical entities, the confirmation of theories, the nature of scientific explanation.

Repeatability: Unlimited as topics vary.

Same as PHILOS 140.

LPS 141A. Topics in Philosophy of Physics. 4 Units.
Selected topics in the philosophy of physics, e.g., the interpretation of quantum mechanics, the nature of spacetime, the problem of quantum field theories.

Repeatability: Unlimited as topics vary.

Same as PHILOS 141A.

LPS 141B. Geometry and Spacetime. 4 Units.
An examination of the foundations of the special theory of relativity, with emphasis on the geometry of Minkowski spacetime, and its relation to both Euclidean and non-Euclidean (hyperbolic) plane geometries.

Prerequisite: MATH 2D and (MATH 3A or MATH 6G)

Same as PHILOS 141B.

LPS 141C. Philosophy of Quantum Mechanics. 4 Units.
An examination of the standard von Neumann-Dirac formulation of quantum mechanics. The quantum measurement problem is discussed along with several proposed solutions, including GRW, many-worlds, man-minds, and Bohm's theory.

Same as PHILOS 141C.

LPS 141D. Probability and Determinism. 4 Units.
An examination of a cluster of interrelated issues concerning probability, determinism, logic, and the foundations of quantum mechanics.

Prerequisite: MATH 2D and (MATH 3A or MATH 6G)

Same as PHILOS 141D.

LPS H141. Honors Philosophy of Quantum Mechanics. 4 Units.
An examination of the standard von Neumann-Dirac formulation of quantum mechanics. The quantum measurement problem is discussed along with several proposed solutions, including GRW, many-worlds, man-minds, and Bohm's theory.

Overlaps with LPS 141C.

Restriction: Campuswide Honors Program students only.

LPS 142. Writing/Philosophy of Biology. 4 Units.
Philosophy of biology, e.g., scientific method in biology, the structure of evolutionary theory, teleology, ethics, and evolution. Course work includes one 4,000-word and four 1,000-word papers.

LPS 142W. Writing/Philosophy of Biology. 4 Units.
Philosophy of biology, e.g., scientific method in biology, the structure of evolutionary theory, teleology, ethics, and evolution. Course work includes one 4,000-word and four 1,000-word papers.

Prerequisite: Satisfactory completion of the Lower-Division Writing requirement.

Same as PHILOS 142W, BIO SCI E142W.

Restriction: Juniors only.
LPS 143. Topics in Philosophy of Psychology. 4 Units.
Selected topics in the philosophy of psychology, e.g., the nature of psychological explanation, reductionism, issues in cognitive, behavioral, and neuroscience.

Repeatability: Unlimited as topics vary.

Same as PHILOS 143, PSYCH 123P.

Restriction: Psychology Majors have first consideration for enrollment. Philosophy Majors have first consideration for enrollment.

LPS 144. Topics in Philosophy of Social Science. 4 Units.
Selected topics in the philosophy of the social sciences, e.g., is their goal to understand behavior or to predict and control it?; are they normative and the natural sciences not?; do they incorporate philosophical doctrines about language and mind?.

Repeatability: Unlimited as topics vary.

Same as PHILOS 144.

LPS 145. Topics in Philosophy of Language. 4 Units.
Selected topics in the philosophy of language, e.g., the nature of meaning, mechanisms of reference, speech acts.

Repeatability: Unlimited as topics vary.

Same as PHILOS 145, LINGUIS 141.

LPS 146. Topics in Philosophy of Logic. 4 Units.
Selected topics in the philosophy of logic, e.g., the nature of logical truth and our knowledge of it, the status of propositions, definite descriptions, and existential presuppositions.

Repeatability: Unlimited as topics vary.

Same as PHILOS 146.

LPS 147. Topics in Philosophy of Mathematics. 4 Units.
Selected historical and contemporary topics in the philosophy of mathematics, e.g., mathematical truth and ontology, mathematical knowledge, the nature and role of proof, the workings of mathematics in application.

Repeatability: Unlimited as topics vary.

Same as PHILOS 147.

LPS 199. Independent Study. 1-4 Units.
Independent research with Logic and Philosophy of Science faculty.

Repeatability: May be taken for credit for 12 units.

LPS 200. Topics in Logic and Philosophy of Science. 4 Units.
Studies in selected areas of Logic and Philosophy of Science. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

LPS 205A. Set Theory. 4 Units.
The basic working vocabulary of mathematical reasoning. Topics include: sets, Boolean operations, ordered n-tuples, relations, functions, ordinal and cardinal numbers.

Same as PHILOS 205A.

LPS 205B. Metalogic. 4 Units.
Formal syntax (proof theory) and semantics (model theory) for first-order logic, including the deduction, completeness, compactness, and Loewenheim-Skolem theorems.

Prerequisite: PHILOS 205A or LPS 205A

Same as PHILOS 205B.
LPS 205C. Undecidability and Incompleteness. 4 Units.
Formal theory of effective processes, including recursive function, Turing machines, Church’s thesis, proofs of Goedel’s incompleteness theorem for arithmetics, and Church’s undecidability for first-order logic.
Prerequisite: PHILOS 205B or LPS 205B
Same as PHILOS 205C.
Restriction: Graduate students only.
 Concurrent with LPS 105C.

LPS 206. Topics in Logic . 4 Units.
Studies in selected areas of logic. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 206.

LPS 213. Topics in Modern Philosophy. 4 Units.
Studies in selected areas of modern philosophy. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 213.

LPS 215. Topics in Analytic Philosophy. 4 Units.
Studies in selected areas of analytic philosophy. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 215.

LPS 220. Topics in Metaphysics. 4 Units.
Studies in selected areas of metaphysics. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 220.

LPS 221. Topics in Epistemology. 4 Units.
Studies in selected areas of epistemology. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 221.

LPS 232. Topics in Political and Social Philosophy. 4 Units.
Studies in selected areas of political and social philosophy. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 232.

LPS 240. Topics in Philosophy of Science. 4 Units.
Studies in selected areas of philosophy of science. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 240.

LPS 241. Topics in Philosophy of Physics. 4 Units.
Studies in selected areas of philosophy of physics. Topics addressed vary each quarter.
Repeatability: Unlimited as topics vary.
Same as PHILOS 241.
LPS 242. Topics in Philosophy of Biology. 4 Units.
Studies in selected areas of philosophy of biology. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

Same as PHILOS 242.

LPS 243. Topics in Philosophy of Psychology. 4 Units.
Selected topics in the philosophy of psychology, e.g., the nature of psychological explanation, reductionism, issues in cognitive, behavioral, and neuroscience.

Repeatability: Unlimited as topics vary.

Same as PHILOS 243, PSYCH 231P.

LPS 244. Topics in Philosophy of Social Science. 4 Units.
Studies in selected areas of philosophy and social science. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

Same as PHILOS 244.

LPS 245. Topics in Philosophy of Language. 4 Units.
Studies in selected areas of philosophy of language. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

Same as PHILOS 245.

LPS 246. Topics in Philosophy of Logic. 4 Units.
Studies in selected areas of philosophy of logic. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

Same as PHILOS 246.

LPS 247. Topics in Philosophy of Mathematics. 4 Units.
Studies in selected areas of philosophy of mathematics. Topics addressed vary each quarter.

Repeatability: Unlimited as topics vary.

Same as PHILOS 247.

LPS 289. Logic and Philosophy of Science Workshop. 1-4 Units.
A two- or three-quarter-long workshop on selected topics in logic and philosophy of science.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

LPS 298. Independent Study. 4-12 Units.
Independent research with Logic and Philosophy of Science Faculty.

Repeatability: May be taken for credit for 12 units.

LPS 299. Directed Research. 1-12 Units.
Directed study with Logic and Philosophy of Science Faculty.

Repeatability: May be repeated for credit unlimited times.

LPS 399. University Teaching. 4-12 Units.
Required of and limited to Teaching Assistants.

Repeatability: May be taken for credit for 12 units.