

History and Philosophy of Science

College of Arts and Sciences Bloomington

Chairperson

Professor Domenico Bertoloni Meli*

Departmental E-mailhpscdept@indiana.edu**Departmental URL**www.indiana.edu/~hpscdept

Graduate Faculty

(An asterisk [*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

Distinguished Professors

H. Scott Gordon* (Emeritus, Economics), Edward Grant* (Emeritus, History), William Royall Newman*

Professors

Colin Allen*, Domenico Bertoloni Meli*, Frederick Churchill* (Emeritus), Noretta Koertge* (Emerita), Elisabeth A. Lloyd*

Associate Professors

James H. Capshew*, Ann Carmichael* (History), Jordi Cat*, Sander Gliboff*, Jutta Schickore*

Assistant Professor

Amit Hagar*

Graduate Advisor

Associate Professor James H. Capshew* (Interim), Goodbody Hall 130, (812) 855-3655

Degrees Offered

Master of Arts, dual Master of Arts and Master of Library Science (jointly with the School of Library and Information Science), and Doctor of Philosophy. Students at IU may also pursue double Ph.D.s with related departments, such as History or Philosophy, writing a single dissertation.

University Graduate School
Kirkwood Hall 111
Indiana University
Bloomington, IN 47405
(812) 855-8853
Contact: grdschl@indiana.edu

Special Departmental Requirements

(See also general University Graduate School requirements.)

Admission Guidelines

Either (1) an undergraduate major in a science or a related group of sciences with a minor in either history or philosophy or (2) an undergraduate major in either history or philosophy with a strong minor in science; or a similar background is preferred. Applicants with divergent backgrounds who can demonstrate serious interest and research potential in HPS are encouraged to apply.

Master of Arts Degree

Course Requirements

A total of 36 credit hours of course work or 30 credit hours of course work together with a satisfactory M.A. thesis. Students who do not write a thesis must choose at least one course which requires the writing of a major research paper. Both options require 24 hours of course work in the department; at least four courses must be selected from the core courses listed below (X506, X507, X551, X552, X556, X706). Students intending to take Ph.D. qualifying exams are advised to take more than the minimum number of core courses required for the M.A.

Grades

A 3.3 (B+) grade point average in departmental courses is required.

Foreign Language/Research-Skill Requirement

Proficiency in one language or one research skill. Students are typically expected to complete this requirement before registering for their third semester in the department. Dual Master of Arts and Master of Library Science Degrees Study for these two degrees can be combined for a total of approximately 51 credit hours rather than the 66 credit hours required for the two degrees taken separately. Students must take 21 credit hours in history and philosophy of science, including three core courses (X506, X507, X551, X552, X556, or X706). The course of studies must be planned in consultation with a history and philosophy of science advisor. Students must also complete 30 credit hours of School of Library and Information Science (SLIS) courses, including completion of SLIS MLS Foundation courses (15 credit hours); other required SLIS courses (9 credit hours); L516 or L586, L624, and L596 and SLIS elective courses. Admission to each of the two areas of study is approved separately on the same basis as for other applicants not in the dual program.

Doctor of Philosophy Degree

Fields of Study

A student may concentrate in either the history or the philosophy of science or pursue both fields simultaneously. This affects the Foreign Language/Research Skill Requirement below.

Course Requirements

A total of 90 credit hours, including courses that meet all requirements for the M.A., plus at least two additional courses approved by the department from its offerings. Students intending to take Ph.D. qualifying exams are advised to take more than the minimum number of core courses required for the M.A. A maximum of 30 credit hours for dissertation work (X700 and X800) may be counted toward the 90 credit hours.

Minor

One minor outside the department is required. The requirements for this minor are set by the department involved. Outside minor fields that students in the history and philosophy of science program have commonly taken include history, mathematics, philosophy, or one of the sciences.

Foreign Language/Research-Skill Requirement

Proficiency either (1) in two languages, or (2) in one language and one research skill, or (3) in one language in depth, depending on the recommendation of the student's advisory committee. Students are normally expected to complete one of these requirements before their third semester in residence and the second-language or tool-skill requirement before their fifth semester.

Qualifying Examination

Written and oral. Examination in minor area is left to the discretion of the minor department. Examinations may not be taken more than twice, except in extraordinary cases.

Research Proposal

Upon advancement to candidacy, if not before, the student must submit and gain departmental approval of a research proposal.

Ph.D. Minor in History and Philosophy of Science

Graduate students from other departments desiring a minor in history and philosophy of science must complete 12 graduate credit hours of course work in the department with a B+ or higher. The set of courses should represent a coordinated objective and must be approved by the Director of Graduate Studies.

Courses

Core Courses

X506 Survey of History of Science up to 1750 (3 cr.) Ancient, Medieval, Renaissance, and Enlightenment science.

X507 Survey of History of Science since 1750 (3 cr.) Growth of physical, biological, and social sciences during the nineteenth

and twentieth centuries. Attention will be paid not only to the scientific contents but to the institutional and social context.

X551 Survey of the Philosophy of Science (3 cr.) Science claims to tell us what the world is like, even the part of the world we cannot see, and to explain why things happen the way they do. But these claims are controversial. Examination of competing models of scientific explanation and the ongoing debate over whether scientific theories should or even can be interpreted realistically.

X552 Modern Philosophy of Science (3 cr.) Origin and character of twentieth-century philosophy of science. Examination of the historical development of the philosophy of science-in interaction with parallel developments within the sciences themselves-from 1800 to the early twentieth century.

X556 History and Philosophy of Premodern Science (3 cr.) Historical survey of philosophical discussions of the nature of science, in the premodern period.

X706 Special Topics in the History and Philosophy of Science (2-4 cr.) Content and instructors will vary; students may thus receive credit more than once. Admission by consent of instructor or chairperson.

Seminars in History of Science

X601 Special Topics in Ancient Science (3 cr.) P: X506 or consent of instructor. The course deals with specific areas in science, philosophy, and technology within the chronological period stretching from 500 BCE to 500 CE. The focus will be texts, and in some instances, Latin or Greek may be required.

X602 Special Topics in Medieval and Renaissance Science (3 cr.) P: X506 or consent of instructor. The chronological scope of this course is roughly 500 to 1600 CE. Topics range over a broad spectrum, from the history of medieval and early modern technology to the emergence and development of the concept of natural magic.

X603 Special Topics in Early Modern Science (3 cr.) P: X506 or consent of instructor. Course will deal with topics in the history of science and culture primarily during the 16th and 17th centuries.

X609 Special Topics in Modern Science (3 cr.) P: X507 or consent of instructor. Selected topics.

X705 Special Topics in the History of Science (2-5 cr.) Content and instructors will vary; students may thus receive credit more than once. Admission by consent of instructor or chairperson.

Issues in Philosophy of Science

X682 Inductive Logic and Probability (3 cr.) Topics in inductive logic such as Hume's problem of induction, Hempel's paradox of confirmation (The Raven paradox), Goodman's new riddle of induction, and Bayesian confirmation theory. Analyses of concepts of probability, such as classical, propensity, frequency, and subjective (e.g., Bayesian) interpretations.

X755 Special Topics in the Philosophy of Science (2-5 cr.)

Content and instructors will vary; students may thus receive credit more than once. Admission by consent of instructor or chairperson.

X756 Special Topics in the Philosophy of Science (2-5 cr.)

Content and instructors will vary; students may thus receive credit more than once. Admission by consent of instructor or chairperson.

X795 Minds, Brains, and Computers (3 cr.)

Philosophical issues in computer and cognitive science. Programming experience for beginners (in Mathematica). Turing machines and computation; computational theories of intelligence, consciousness, and vision; cellular automata and the behavior of complex systems; chaos theory and fractals; problem solving, search, and two-person games; knowledge representation and computer reasoning.

Seminar in History and Philosophy of Science**X521 Research Topics in the History and Philosophy of Science (1-3 cr.)**

Historical investigation of science to deepen understanding of issues arising in the philosophy of science, and application of philosophy of science to illuminate topics in the history of science. Focus may be on substantive historical and philosophical issues arising in a specific science (or cluster of related sciences), or on general methodological issues concerning the relationship between history of science and philosophy of science.

History and Philosophy of Modern Physical Sciences**X687 Seminar: Philosophical Problems of Chaos Theory (3 cr.)**

Philosophical examination of nonlinear dynamics and chaotic phenomena. Topics include: modeling, unpredictability and determinism, free will and chaos in psychology, implications for historical and social sciences, information and complexity.

X691 Seminar: Philosophical Problems of Space, Time, and Spacetime (4 cr.)

P: X491 or consent of instructor. The direction of time; causal theory of time; intrinsic and extrinsic metrics; congruence in geometry and chronometry; spacetime in special and general relativity.

X790 Space, Time and Relativity of Theory (3 cr.)

Topics in the philosophy of space, time, and space-time. Theory of motion and Zeno's paradoxes; St. Augustine on time; time and becoming; relational versus absolute theories of space and time; Mach's principle; introduction to Einstein's theory of relativity and space-time.

X791 Philosophical Issues in Quantum Theory (3 cr.)

Examination of philosophical problems and challenges raised by quantum theory, with topics including Heisenberg uncertainty relations, nonlocality and EPR paradox, hidden variables, interpretations of quantum theory. No previous knowledge of quantum theory assumed.

History and Philosophy of the Life Sciences

X508 History of Biology (3 cr.) P: Junior standing or consent of instructor. Survey of the most important developments in biology from antiquity to the twenty-first century. Examination of such topics as changes in evolution theory, concepts of development and inheritance, instruments and the rise of the laboratory, and physiology.

X632 Seminar: Historical Problems in Evolutionary Biology (3 cr.)

P: X325 or X408/X508 or consent of instructor. Historical examination of such topics as pre-Darwinism, Naturphilosophie, Darwin and *The Origin of Species*, rise of modern systematics, and concepts of race. Content will vary; students may receive credit more than once.

X693 Philosophy of Biology (3 cr.)

Survey of the important concepts in biology from antiquity to the present. Emphasis on changes in evolution theory and concepts of development and inheritance. A familiarity with biology is helpful but not necessary.

History and Philosophy of the Social and Behavioral Sciences

X642 History of Psychology (3 cr.) Explores the scientific, professional, and cultural dimensions of modern psychology, including its emergence as an academic discipline in the late nineteenth century. Focus on interpretive issues raised by recent scholarship.

X654 Seminar: Philosophy of the Social Sciences (4 cr.)

P: X552 or consent of instructor. Examination of such topics as objectivity, generality, social laws, role of values in social inquiry, methodological individualism, and relation of the social sciences to psychology, operationism, behaviorism, and other reductivist proposals.

Science in Cultural Contexts

X301 Growth of Scientific Establishment (3 cr.) Please note: This course is not currently being offered.

X645 History of American Science (3 cr.) An historical exploration of the intellectual and institutional development of science in the United States from colonial times to the present. Examines recent scholarship in the history of American science and related historiographical trends and issues.

X670 Science and Gender (3 cr.) The role of science and technology in constructions of masculinity and femininity from 1600 to present. Historical and philosophical analysis of the interaction between science and technology and ideologies of gender. Evaluation of proposals for transforming science.

X671 Topics in the Science of Sex and Gender (3 cr.) P: May vary with topic. Possible topics include history of theories of sexuality, critique of current scientific concepts of sex and gender, philosophical perspectives on sexology, and the history of theories of sex evolution and determination. May be repeated twice for credit with different topic.

Cross-Listed Course in Anthropology
H500 History of Anthropological Thought in the Nineteenth and Twentieth Centuries (3 cr.)

Cross-Listed Course in English
L769 Literature and Science (4 cr.)

Cross-Listed Course in Journalism
J554 Seminar: Science Writing (3 cr.)

Cross-Listed Course in Sociology
S660 Sociology of Science (3 cr.)

Individualized Study
X600 Advanced Readings Course (cr. arr.)**
X700 M.A. Thesis (cr. arr.)**
X800 Ph.D. Thesis (cr. arr.)**

**These courses are eligible for a deferred grade.

History and Philosophy of the Biomedical Sciences (available from the Department of History and Philosophy of Science and the Department of History)

A broad range of courses and seminars covering the history of medicine from antiquity to modern America are offered on a regular basis.

Logic Courses

A variety of logic courses is regularly offered through the Philosophy and Mathematics departments. Students should consult the Philosophy Department's graduate bulletin for the most current list of logic courses offered for graduate credit. Ph.D. students in History and Philosophy of Science who wish to satisfy their research skills requirement in logic must consult with the director of graduate students in the Philosophy Department to determine which courses they may take to meet that department's formal logic requirement. Minimally, students must demonstrate a thorough understanding of first-order logic and take two graduate courses in logic broadly construed to include philosophy of mathematics and philosophy of language, of which at least one is in logic narrowly construed, i.e., involving formal methods and metatheory.