Guide to the Science Area
For History and Science Concentrators
Science and Society Track
2015-2016

Department of the History of Science

This guide provides ideas for designing your own program of study as a concentrator in History and Science. There are two ways to concentrate in History and Science. You may choose our History of Science track, which does not require a science area. Alternatively, you may pursue our Science and Society track, which allows you to combine the study of a specific science with coursework in history of science and its allied disciplines. This document is specifically for ***students choosing our Science and Society track***, and is designed to guide you in your choice of science courses for the concentration.

Some of the courses mentioned in this document may no longer be in the catalog; other new courses are added every year. Remember that you can count no more than two introductory courses toward concentration credit in the science area. Introductory courses are normally considered to be courses that do not have a college-level prerequisite, and we have noted them with an asterisk.

This list does not define the requirements for the honors-eligible Focus in Medicine and Society or the Focus in Mind, Brain, and Behavior within the Science and Society track. Please refer to the study guide for each focus.

Students should submit a list of proposed courses for the science area on the Courses in Concentration Form, which must then be approved by the Manager of Student Programs or the Director of Undergraduate Studies. It is also important that students review their Courses in Concentration form at least once a year, and update it whenever there is a change in the list of courses actually being taken for credit in the concentration.

<u>Common Science Areas</u>

Astronomy and Astrophysics
Chemistry
Computer Science
Earth and Planetary Sciences/Environmental Sciences
Engineering Sciences
Human Evolutionary Biology
Life Sciences
Mathematics
Molecular and Cellular Biology
Neurobiology
Organismic and Evolutionary Biology
Physics
Psychology
Statistics
Stem Cell and Regenerative Biology

PLEASE NOTE – THIS LIST IS NOT EXHAUSTIVE OR DEFINITIVE

SCIENCE AREAS

Astronomy and Astrophysics

Astonomy Courses numbered 100 and above

Astronomy 2. Celestial Navigation
Astronomy 16. Stellar and Planetary Astronomy
Astronomy 17. Galactic and Extragalactic Astronomy
Astronomy 130. Cosmology
Astronomy 151. Astrophysical Fluid Dynamics
Astronomy 191. Astrophysics Laboratory

Chemistry

The Chemistry 17/27 sequence is intended primarily for students in the life sciences; the 20/30 sequence is intended primarily for Chemistry concentrators and other students concentrating in the physical sciences. Either sequence satisfies the organic chemistry requirement for medical school.

A common chemistry area sequence for History and Science concentrators which satisfies the general chemistry and organic chemistry requirement for medical school is:

*__Life Sciences 1a.__ An Integrated Introduction to the Life Sciences: Chemistry, Molecular Biology, and Cell Biology
*__Physical Sciences 1.__ Chemical Bonding, Energy, and Reactivity: An Introduction to the Physical Sciences
Chemistry 17. Principles of Organic Chemistry
Chemistry 27. Organic Chemistry of Life

Other sequences can include:

Chemistry and Chemical Biology Department Courses numbered 100 and above

*Life and Physical Sciences A. Foundational Chemistry and Biology
*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
Physical Sciences 2. Mechanics, Elasticity, Fluids, and Diffusion
Physical Sciences 3. Electromagnetism, Waves, Imaging, and Information
Chemistry 20. Organic Chemistry
Chemistry 30. Organic Chemistry
Chemistry 40. Inorganic Chemistry
Chemistry 60. Foundations of Physical Chemistry

Computer Science

Computer Science Courses numbered 100 and above

*Computer Science 1. Great Ideas in Computer Science
*Computer Science 50. Introduction to Computer Science I
Computer Science 51. Introduction to Computer Science II
Computer Science 61 (formerly Computer Science 160). Systems Programming and Machine Organization

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Earth and Planetary Sciences/Environmental Sciences

Earth and Planetary Sciences courses numbered 100 and above

E-PSCI 21. The Dynamic Earth: Geology and Tectonics Through Time
E-PSCI 22. The Fluid Earth: Oceans, Atmosphere, Climate, and Environment
SPU 12. Natural Disasters
SPU 14. How to Build a Habitable Planet
SPU 25. Energy and Climate for the 21st Century
SPU 29. The Climate-Energy Challenge
SPU 31. Energy Resources and the Environment
Astronomy 16. Stellar and Planetary Astronomy
Engineering Sciences 120. Introduction to the Mechanics of Solids
Engineering Sciences 123. Introduction to Fluid Mechanics and Transport Processes
Engineering Sciences 164. Environmental Chemistry

Engineering Sciences

Engineering Sciences courses numbered 100 and above

*Engineering Sciences 6. Introduction to Environmental Science and Engineering
Engineering Sciences 20. How to Create Things and Have Them Matter
*Engineering Sciences 50. Introduction to Electrical Engineering
Engineering Sciences 51. Computer-Aided Machine Design
Engineering Sciences 53. Quantitative Physiology as a Basis for Bioengineering
Earth and Planetary Sciences 133. Atmospheric Chemistry

Human Evolutionary Biology

HEB Courses numbered 1200 and above

*Life and Physical Sciences A. Foundational Chemistry and Biology
*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
Life Sciences 2. Evolutionary Human Physiology and Anatomy
*OEB 10. Foundations of Biological Diversity

Life Sciences

*Life and Physical Sciences A. Foundational Chemistry and Biology
*Life Sciences 1a. An Integrated Introduction to the Life Sciences: Chemistry, Molecular Biology, and Cell Biology
*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
Life Sciences 2. Evolutionary Human Physiology and Anatomy
Life Sciences 50ab. Integrated Science
Life Sciences 100. Experimental Research in the Life Sciences
Life Sciences 120. Global Health Threats
*Science of Living Systems 11. Molecules of Life
SCRB 60. Ethics, Biotechnology, and the Future of Human Nature

Mathematics

Applied Mathematics Department courses numbered 100 and above
Mathematics Department courses numbered 100 and above
Statistics Department courses numbered 110 and above
*Mathematics Ma. Introduction to Functions and Calculus I
*Mathematics Mb. Introduction to Functions and Calculus II
*Mathematics 1a. Introduction to Calculus
Mathematics 1b. Calculus, Series, and Differential Equations
Mathematics 18. Multivariable Calculus for Social Sciences
Mathematics 19a. Modeling and Differential Equations for the Life Sciences
Mathematics 19b. Linear Algebra, Probability, and Statistics for the Life Sciences
Mathematics 21a. Multivariable Calculus
Mathematics 21b. Linear Algebra and Differential Equations
Mathematics 23a. Linear Algebra and Real Analysis I
Mathematics 23b. Linear Algebra and Real Analysis II
Mathematics 25a. Honors Linear Algebra and Real Analysis I
Mathematics 25b. Honors Linear Algebra and Real Analysis II
Mathematics 55a. Honors Abstract Algebra
Mathematics 55b. Honors Real and Complex Analysis
Applied Mathematics 21a. Mathematical Methods in the Sciences
Applied Mathematics 21b. Mathematical Methods in the Sciences
*Statistics 100. Introduction to Quantitative Methods for the Social Sciences and Humanities
*Statistics 101. Introduction to Quantitative Methods for Psychology and the Behavioral Sciences
*Statistics 102. Introduction to Statistics for Life Sciences
*Statistics 104. Introduction to Quantitative Methods for Economics

Molecular and Cellular Biology

Molecular and Cellular Biology Department courses numbered 100 and above
*Life and Physical Sciences A. Foundational Chemistry and Biology
*Life Sciences 1a. An Integrated Introduction to the Life Sciences: Chemistry, Molecular Biology, and Cell Biology
*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
*MCB 80 (formerly Biological Sciences 80). Neurobiology of Behavior

Neurobiology

Neurobiology Department courses numbered 100 and above
*Life Sciences 1a. An Integrated Introduction to the Life Sciences: Chemistry, Molecular Biology, and Cell Biology
*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
*MCB 80 (formerly Biological Sciences 80). Neurobiology of Behavior
*MCB 81. Fundamentals of Neuroscience
Neurobiology 101. Auditory Neurobiology
BCMP 213. Behavioral Pharmacology

Life Sciences 100. Experimental Research in the Life Sciences
MCB 105. Systems Neuroscience
MCB 115. Cellular Basis of Neuronal Function
MCB 125. Molecular Basis of Behavior
MCB 129. The Brain: Development, Plasticity and Decline
MCB 145. Neurobiology of Perception and Decision Making
MCB 146. Experience-Based Brain Development: Causes and Consequences
MCB 148. The Neurobiology of Pain
MCB 170. Brain Invaders: Building and Breaking Barriers in the Nervous System
MCB 186. Circadian Biology: From Cellular Oscillators to Sleep Regulation
OEB 57. Animal Behavior
OEB 105. Neurobiology of Motor Control
OEB 223. Topics in Neurogenetics
Physics 141. The Physics of Sensory Systems in Biology
Psychology 1052. The Application of fMRI in Cognitive Neuroscience Research
Psychology 1201. Your Brain on Drugs: Psychopharmacology
Psychology 1304. Brain Damage as a Window into the Mind: Cognitive Neuropsychology
Psychology 1430. Human Memory and Amnesia
Psychology 1452. The Human Face
SCRB 180. Regeneration and Repair in the Mammalian Brain
SCRB 182. Got (New) Brain? The Evolution of Brain Regeneration

Organismic and Evolutionary Biology

Oganismic and Evolutionary Biology Department courses numbered 100 and above

*Life Sciences 1b. An Integrated Introduction to the Life Sciences: Genetics, Genomics, and Evolution
Life Sciences 2. Evolutionary Human Physiology and Anatomy
*OEB 10. Foundations of Biological Diversity
OEB 50. Genetics and Genomics
OEB 51. Biology and Evolution of Invertebrate Animals
OEB 52. Biology of Plants
OEB 53. Evolutionary Biology
OEB 54. Biology of the Fungi
OEB 55. Ecology: Populations, Communities, and Ecosystems
OEB 56. Geobiology and the History of Life
OEB 57. Animal Behavior
OEB 59. Plants and Human Affairs

Physics

Physics Department Courses numbered 100 and above

Physical Sciences 2. Mechanics, Elasticity, Fluids, and Diffusion
Physical Sciences 3. Electromagnetism, Waves, Imaging, and Information
Physical Sciences 12a. Mechanics from an Analytic, Numerical, and Experimental Perspective
*Physics 15a. Introductory Mechanics and Relativity
*Physics 15b. Introductory Electromagnetism
Physics 15c. Wave Phenomena

Physics 16. Mechanics and Special Relativity
Applied Physics 50a. Physics as a Foundation for Science and Engineering, Part I
Applied Physics 50b. Physics as a Foundation for Science and Engineering, Part II
Applied Physics 195. Introduction to Solid State Physics
Astronomy 191. Astrophysics Laboratory
Chemistry 160. The Quantum World
Chemistry 161. Statistical Thermodynamics
Chemistry 163. Frontiers in Biophysics
Chemistry 165. Experimental Physical Chemistry
Earth and Planetary Sciences 131. Introduction to Physical Oceanography and Climate
Engineering Sciences 120. Introduction to the Mechanics of Solids
Engineering Sciences 123. Introduction to Fluid Mechanics and Transport Processes
Engineering Sciences 154. Electronic Devices and Circuits
Engineering Sciences 173. Electronic and Photonic Devices
Engineering Sciences 181. Engineering Thermodynamics
Engineering Sciences 190. Introduction to Materials Science and Engineering

(**Note**: If you take Physics 15a, b, and c, you may count the combination of Math 21a **and** Math 21b for a fourth physics course)

Psychology

The science area in Psychology must include Science of Living Systems 20. Psychological Science. It is recommended that students who plan to do advanced work in a laboratory setting also enroll in either Psychology 1900 or Statistics 100, 101, or 102. These courses count as introductory courses.

Required Course for All Areas:

1. *Science of Living Systems 20. Psychological Science

The remaining three courses should be chosen from ONE of the following sub-fields. It is recommended that students choose to take the first course listed in each section, since those courses (Psychology 13, 14, 15, 16, 18) act as a prerequisite for many of the other courses in each respective section.

Cognitive Psychology

Psychology 14. Cognitive Neuroscience
Psychology 1057. Music and the Mind
Psychology 1201. Your Brain on Drugs: Psychopharmacology
Psychology 1301. Brain Science for World Leaders
Psychology 1304. Brain Damage as a Window in the Mind: Cognitive Neuropsychology
Psychology 1305. Evolution and Cognition
Psychology 1307. Brain Genomics
Psychology 1351. Object Representation in the Mind and Brain
Psychology 1352. Foundations of Cognitive Neuroscience Research

Psychology 1355. The Adolescent Brain
Psychology 1401. Computational Cognitive Neuroscience
Psychology 1430. Human Memory and Amnesia
Psychology 1432. The Human Face
Psychology 1453. Consciousness Explored

Social Psychology

Psychology 15. Social Psychology
Psychology 1500. Decision Making and Negotiation
Psychology 1502. Cultural Psychology: Exploring Social Identities in the U.S. and Beyond
Psychology 1503. Psychology of Close Relationships
Psychology 1504. Social Cognition: Making Sense of our Social World
Psychology 1506. Groups and Networks: How Others Shape our Behavior, Beliefs, and Motivations
Psychology 1508. How to Nudge: Using Social Psychology and Decision Science to Change Behavior and Policy
Psychology 1515. Psychology of Groups at Work
Psychology 1553. Social Bonds and Human Connections
Psychology 1556r. Research Seminar in Implicit Social Cognition
Psychology 1559. The Social Brain

Developmental Psychology

Psychology 15. Social Psychology
Psychology 1604. Social Development
Psychology 1605. Psychology of Language
Psychology 1651r. Language Development: Undergraduate Laboratory Course: Research Seminar
Psychology 1652r. Laboratory in Early Cognitive Development
Psychology 1654. Topics in Cognitive Development: Seminar
Psychology 1655r. Conceptual Development: Undergraduate Laboratory Course

Psychopathology

Psychology 18. Abnormal Psychology
Psychology 1801. Anxiety Disorders
Psychology 1851. Clinical Psychology: Science and Practice
Psychology 1852. Clinical Psychology in Everyday Life
Psychology 1853. Self-Destructive Behaviors
Psychology 1854. Schizophrenia: Seminar
Psychology 1855. Mood Disorders
Psychology 1856. Cognition and Psychopathology
Psychology 1857. Psychotherapy: Science and Practice
Psychology 1858. Stress, Coping, and Resilience
Psychology 1861. Developmental Psychopathology

Statistics

Statistics Department courses numbered 110 and above

*Statistics 100. Introduction to Quantitative Methods for the Social Sciences and Humanities
*Statistics 101. Introduction to Quantitative Methods for Psychology and the Behavioral Sciences
*Statistics 102. Introduction to Statistics for Life Sciences
*Statistics 104. Introduction to Quantitative Methods for Economics
*Statistics 107. Introduction to Business and Financial Statistics

Stem Cell and Regenerative Biology

Stem Cell and Regenerative Biology Department courses numbered 100 and above

SCRB 10. Human Developmental and Regenerative Biology
SCRB 20. Molecular Genetics and Genomics in Development and Disease
SCRB 25. Biochemistry and Human Metabolism
SCRB 60. Ethics, Biotechnology, and the Future of Human Nature
SCRB 91r. Introduction to Research