

General Interest & Entry Level Science Courses Spring 2010

First-year seminars are noted as such. These seminars may be at capacity; however, interested students may want to shop them.

Applied Math

APMA 0160 - Introduction to Scientific Computing

For student in any discipline that may involve numerical computations. Includes instruction for programming in MATLAB. Applications discussed include solution of linear equations (with vectors and matrices) and nonlinear equations (by bisection, iteration, and Newton's method), interpolation, and curve-fitting, difference equations, iterated maps, numerical differentiation and integration, and differential equations.

Prerequisite: MATH 0100 or its equivalent.

9:00 am - 9:50 am MWF Location TBA

Community Health

PHP 0030 - Health of Hispaniola—First-Year Seminar

Two developing countries, Dominican Republic and Haiti, have widely differing health outcomes despite centuries of shared experience on the Caribbean Island of Hispaniola. This course will examine the history, politics, economics, culture, international relations, demography, and geography, as well as epidemiology and health services, to demonstrate that multiple factors, both recent and long-standing, determine the present health of these populations.

6:30 pm - 7:50 pm TR Location TBA

Biological Sciences

NEUR 0650 - Biology of Hearing

Examines the sensory and perceptual system for hearing: the external, middle, and inner ears; the active processes of the cochlea; sound transduction and neural coding; neural information processing by the auditory system; and the nature of auditory perception and its biological substrate. Prerequisite: NEUR 0010 or other introductory course in Neuroscience, Cognitive Science, Physics, Engineering, or Psychology.

1:00 pm - 1:50 pm MWF Location TBA

BIOL 0190E - Botanical Roots of Modern Medicine

This course will explore a variety of medicinal plants found throughout the world, the diverse cultures that use them in their daily lives and the scientific underpinnings of their medicinal uses. In conjunction with readings, students will gain a hands-on approach in lab, observing, identifying, and growing these plants. Enrollment limited to

20. Students MUST register for the lecture section and the lab.

4:00 pm - 5:20 pm T Location TBA

3:00 pm - 4:20 pm W Location TBA

Laboratory 4:30 pm - 5:50 pm W Location TBA

BIOL 0190H - Plants, Food, and People

Examines the selection, breeding, cultivation and uses of food plants. Discusses the effects on agriculture of pathogens, climate change, and loss of biodiversity. Considers whether enough food can be produced for a world population of potentially 10 billion, while sustaining biodiversity and environmental quality.

3:00 pm - 4:20 pm MW Location, TBA

BIOL 01900 - Conservation Medicine – First Year-Seminar

Conservation Medicine is an interdisciplinary field that studies the relationship between human health, wildlife disease, and environmental conditions. We will explore links between changes to the environment, including exotic species invasions, land-use, and climate change, and the emergence of infectious diseases in humans and wildlife. We will assess the implications of emerging infectious disease and the tools used to prevent them. We will use case studies of emerging infectious diseases linked to environmental change to survey contemporary issues in conservation medicine.

3:00 pm - 5:20 pm W Location TBA

BIOL 0200 - The Foundation of Living Systems

A broad overview of biological systems, emphasizing patterns and processes that form the basis of life. Explores essentials of biochemistry, molecular, and cellular biology and their relationship to the larger issues of ecology, evolution, and development. Examines current research trends in biology and their influence on culture. Appropriate for all students interested in biology. Serves as a gateway course to much of the intermediate and advanced curriculum. Placement tests are offered (contact Jody_Hall@brown.edu); AP scores of 4 or 5 are equivalent to BIOL 0200. Students will be assigned to a lab section during the second week of class.

11:00 am - 11:50 am MWF Location TBA

Chemistry

CHEM 0330 - Equilibrium, Rate, and Structure

Explores the electronic structure of atoms and molecules, thermodynamics, solution equilibrium, electrochemistry, chemical kinetics, and reaction mechanisms. Three hours of lecture and five hours of prelaboratory and laboratory per week. Recommended background: Advanced placement high school chemistry (or equivalently, at least two years of high school chemistry), or IBC Chemistry or CHEM 0100.

Conference/Discussion 12:00 pm - 12:50 pm W Location TBA

Conference/Discussion 12:00 pm - 12:50 pm R Location TBA

Laboratory 1:00 pm - 4:50 pm W Location TBA

Laboratory 2:00 pm - 5:50 pm W Location TBA
Laboratory 1:00 pm - 4:50 pm R Location TBA
Laboratory 2:00 pm - 5:50 pm R Location TBA
Lecture 10:00 am - 10:50 am MWF Location TBA

Computer Science

CSCI 0040 - Introduction to Scientific Computing and Problem Solving

An introduction to computer programming and software design in a high-level language. Emphasizes fundamental techniques and strategies for solving scientific problems with computers. Illustrates abstract concepts with a wide range of exemplary applications from engineering, the sciences, and the humanities. Intended primarily for students not concentrating in computer science who want a single application-oriented programming course. No prerequisites.

2:30 pm - 3:50 pm TR Location TBA

Engineering

ENGN 0020 - Transforming Society-Technology and Choices for the Future

This course will address the impact that technology has on society, the central role of technology on many political issues, and the need for all educated individuals to understand basic technology and reach an informed opinion on a particular topic of national or international interest. The course will begin with a brief history of technology.

Conference/Discussion 10:30 am - 11:50 am T Location TBA

Conference/Discussion 10:30 am - 11:50 am R Location TBA

Conference/Discussion 2:30 pm - 3:50 pm T Location TBA

Conference/Discussion 2:30 pm - 3:50 pm R Location TBA

Class 10:00 am - 10:50 am MWF Location TBA

ENGN 0120A - Crossing the Space Chasm Through Engineering Design – First-Year Seminar

Five decades of human activity in space has provided the world with benefits including instant global communications and positioning, human and robotic exploration of the moon, and a perspective on earth that continues to inform and influence our relationship with our environment. Unlike other technical revolutions of the 20th century, space has not transitioned to a commercial, consumer market commodity. To experience the challenges of engineering design and of changing an industrial paradigm, students will work in one or several groups to identify a use of space, and a plan for its implementation, that could help transition space from its status as a niche technology. Through the process of design, we will confront the technical, economic, societal, and political barriers to obtaining increased benefits from technologies in general, and space in particular, and to making new technologies beneficial to a wider range of users.

2:00 pm - 2:50 pm MWF Location TBA

Environmental Science

ENVS 0410 - Environmental Stewardship

This course addresses the economics and logistics of implementing strategies to conserve resources and reduce the negative impacts of the built environment. The goal is to learn the rationale, process, and technical aspects of the practice of environmental stewardship. Topics include sustainable design, institutional change, and corporate environmental responsibility. Students collaborate in interdisciplinary teams on applied projects. Permission by instructor by application process prior to enrollment in the class.
1:00 pm – 2:50 pm MW Location TBA

ENVS 0490 - Environmental Science in a Changing World

Introduces students to environmental science and the challenges we face in studying an ever-changing earth system. We will explore what is known, and not known, about how ecosystems respond to perturbations. This understanding is crucial, because natural systems provide vital services (water and air filtration, climate stabilization, food supply, erosion, and flood control) that cannot be easily or inexpensively replicated. Special emphasis will be placed on climate and land use change, the mechanization of agriculture, and invasive species. We will use these topics as springboards to explore the utility of the scientific method, the role science can play in policy decisions, and the environmental challenges that face industrial society over the coming century.
Class 10:30 am - 11:50 am TR Location TBA
Laboratory information not currently available.

Geology

GEOL 0010 - Face of the Earth

Study of Earth's surface (e.g., mountains, rivers, shorelines) and processes which have created and modify it (e.g., glaciation, floods, volcanism, plate tectonics, earthquakes). The goals are to increase appreciation and enjoyment of our natural surroundings and provide a better understanding of environmental problems, natural resources, land use, and geologic hazards. Four labs, plus a field trip. For nonscience concentrators. (Science concentrators should take GEOL 0220.) Students MUST register for the lecture section and a lab. Enrollment limited to 100.

Laboratory 3:00 pm - 5:00 pm M Location TBA

Laboratory 7:00 pm - 9:00 pm M Location TBA

Laboratory 3:00 pm - 5:00 pm W Location TBA

Laboratory 7:00 pm - 9:00 pm W Location TBA

Class 1:00 pm - 1:50 pm MWF Location TBA

GEOL 0070 - Introduction to Oceanography

Examines the ocean's role in global (and local) change, emphasizing the ocean as an evolving, dynamically balanced ecosystem. Focus on physical/chemical/biological

systems' interconnections needed to understand the natural variability of the ocean on various time and space scales, from El Niño to global warming. Three lectures, one section meeting weekly; written exercises on oceanographic problems; two field trips to study estuarine and coastal processes.

2:00 pm - 2:50 pm MWF Location TBA

Physics

PHYS 0100 - Flat Earth to Quantum Uncertainty: On the Nature and Meaning of Scientific Explanation – First-Year Seminar

Physics has had a dramatic impact on our conception of the universe, our ideas concerning the nature of knowledge, and our view of ourselves. Philosophy, sometimes inspired by developments in physics, considers the impact of such developments on our lives. In this seminar, students will explore how classical and modern physical theory have affected our view of the cosmos, of ourselves as human beings, as well as our view of the relation of mathematical or physical structures to 'truth' or 'reality.' Through a study of physics as well as selected philosophical readings, we will consider how we can know anything, from seemingly simple facts to whether a machine is conscious. FYS

2:30 pm - 3:50 pm TR Location TBA

PHYS 0120 - Adventures in Nanoworld – First-Year Seminar

Richard Feynman famously said, "There's plenty of room at the bottom," about the possibility of building molecular-size machines operating according to Quantum Mechanics. Scientists are now learning the art, and students in this course will use basic physics and simple mathematical models to understand the phenomena and materials in the nanoworld. Non-science concentrators and potential science concentrators alike will learn about important classes of nanosystems such as macromolecules, nanotubes, quantum dots, quantum wires, and films. We will learn how people make nanosystems and characterize them. We will consider existing and potential applications of nanotechnology, including molecular motors, nanoelectronics, spintronics, and quantum information.

1:00 pm - 2:20 pm TR Location TBA

PHYS 0220 - Beginning Astronomy

An introduction to basic ideas and observations in astronomy, starting with the observed sky, coordinates and astronomical calendars and cycles, the historical development of our understanding of astronomical objects. Particular emphasis is placed on the properties of stars, galaxies, and the Universe as a whole. The material is covered at a more basic level than PHYS 0270. Knowledge of basic algebra and trigonometry is required, but no experience with calculus is necessary. The course includes evening laboratory sessions.

10:30 am - 11:50 am TR Location TBA