# Department of Natural Sciences


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## Field Description

The Department of Natural Sciences is an integrated department offering a wide selection of courses in biology, chemistry, environmental studies, and physics. The mission of the department is threefold: (1) to engage all students in the scientific enterprise through hands-on learning, enabling them to become scientifically literate citizens who are able to make informed decisions about public policy issues; (2) to prepare students for admission to and success in graduate and professional schools and for entry into the scientific workforce; and (3) to provide research opportunities for Baruch College students.

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## The Majors

Biological Sciences
Arts And Sciences Ad Hoc Major in Natural Science Areas

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### Biological Sciences

Whether you're a new student interested in the sciences, or a returning student planning a career change, the Department of Natural Sciences at Baruch's Weissman School of Arts and Sciences offers you flexible programs that can be tailored to suit your interests and to help you achieve your career goals. The Biological Sciences Major offers a rich variety of courses in biology, chemistry, and environmental studies. Students, in consultation with a faculty advisor, may design programs that prepare them for careers or advanced studies in many science and health-related fields.

In small classes, students receive personal attention from faculty, who are recognized experts in their fields. Advanced students can participate in faculty research projects on campus or at institutions where Baruch professors have collaborative arrangements. These research activities not only provide a unique learning experience, but students can earn academic credit as independent study and honors courses. One semester (4 credits) of independent study or honors research may be included in the major elective courses for students planning on professional education in health care fields. Two semesters (8 credits) ma be approved by the department for students planning on graduate education toward careers in research.

Interested students should contact the Department of Natural Sciences at 646 660-6250.

| **Base Curriculum Courses**<br>*No credit toward the major/specialization* | | |
|---|---|---|
| BIO 2010 | Principles of Biology I | 4.5 credits |
| CHM 2003 | General Chemistry I | 4 credits |
| MTH 2003 | Pre-calculus and Elements of Calculus * | 3 credits |

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|---|---|---|
| *or* | | |
| MTH 2009 | Precalculus | 3 credits |
| *or* | | |
| | A more advanced calculus course | 3-4 credits |
| **** Please note:** **Students with credit for MTH 2000 or MTH 2001 must complete a calculus course, typically, MTH 2207.*** | | |
| **Program Prerequisites** | 16.5 – 17.5 credits | |
| BIO 3001 | Principles of Biology II | 4.5 credits |
| CHM 3001 | General Chemistry II | 4 credits |
| CHM 3003 | Principles of Organic Chemistry I | 4 credits |
| PHY 2003 | General Physics I | 4 credits |
| *or* | | |
| PHY 3010 | Quantitative Physics I | 5 credits |
| **Required Courses** | 7 credits | |
| PSY 2100 | Statistics for Social Sciences *(formerly STA 2100)* | 3 credits |
| *or* | | |
| STA 2000 | Business Statistics | 3 credits |
| *or* | | |
| BIO 2100 | Biostatistics ( ENV 2100) | 3 credits |
| BIO 3015 | Principles of Genetics | 4 credits |
| **Electives** | 19 – 20.5 credits<br><br>Electives are based on students' interests and future goals, and are chosen in consultation with a faculty advisor. The major includes five elective courses, at least two of which must be at the 4000-level or higher, chosen from the following list: | |
| BIO 3005 | Molecular and Cellular Biology | 4 credits |
| BIO 3009 | Conservation Biology and Sustainable Development ( ENV 3009) | 4.5 credits |
| BIO 3010 | Comparative Vertebrate Anatomy | 4 credits |
| BIO 3012 | Endocrinology | 4 credits |
| BIO 3020 | Biology of Invertebrates ( ENV 3020) | 4 credits |
| BIO 3030 | History and Evolution of Life ( ENV 3030)<br><br>***effective spring 2019** course title changes to:* **Principles of Evolution: Processes, Patterns, and the History of Life** | 4 credits |
| BIO 3035 | Introduction to Molecular Biotechnology | 4 credits |

| | | |
|---|---|---|
| BIO 3040 | Plants in Action | 4 credits |
| BIO 4004 | Microbiology | 4 credits |
| BIO 4010 | Human Physiology | 4 credits |
| BIO 4015 | Developmental Biology | 4 credits |
| BIO 5000-5004 | Independent Study | 3-4 credits |
| BIO 6001H-6003H | Honors | 4 credits |
| CHM 4010 | Medicinal Chemistry | 4 credits |
| CHM 4900 | Biochemistry | 4 credits |
| CHM 5000-5004 | Independent Study | 3-4 credits |
| CHM 6001H-6003H | Honors | 4 credits |
| ENV 3001 | Introduction to Environmental Science | 4 credits |
| ENV 3002 | Energy Conservation | 4 credits |
| ENV 3003 | Human Conservation | 4 credits |
| ENV 3005 | Economic and Legal Aspects of Ecology | 4 credits |
| ENV 3006 | Global Ecology | 4 credits |
| ENV 3008 | Air and Water Pollution | 4 credits |
| ENV 3015L | Tropical Reef Ecology (plus lab ENV 3015) | 3 credits |
| ENV 3050 | Freshwater Ecology (BIO 3050) | 4 credits |
| ENV 4005 | Ecosystem Sustainability | 4 credits |
| ENV 4020 | Microbial Ecology | 4 credits |
| ENV 4900 | Topics in Environmental Science | 4 credits |
| ENV 5000-5004 | Independent Study | 3-4 credits |
| ENV 6001H-6002H | Honors | 4 credits |

### Arts And Sciences Ad Hoc Major in Natural Science Areas

When a student's educational objectives cannot be fully attained solely by study within an existing department, program, or school, he or she is given the option of devising an ad hoc pattern of courses in an area of concentration of his or her own choosing. A student may embark upon an ad hoc major following preparation and acceptance of a proposal outlining the area of study, the desired outcomes, and the educational values of the program. The program must be approved by the Office of the Associate Dean, Weissman School of Arts and Sciences.

The Department of Natural Sciences offers a pre-professional specialization that enables students to include chemistry and physics courses as part of an arts and sciences ad hoc major. Students prepare for entry into professional schools of medicine, dentistry, and other health care fields; graduate study in biological sciences; and teaching of biology, chemistry, and general sciences. Students combine basic courses in chemistry and physics with advanced electives.

The department also offers a specialization in environmental studies as part of an arts and sciences ad hoc major. This major includes a variety of courses in the sciences and additional courses from the Weissman School of Arts and Sciences, the Zicklin School of Business, and the Marxe School of Public and International Affairs. This ad hoc major integrates ecological principles in the dual context of science and society.

Prospective students are urged to register with the office of the Department of Natural Sciences early in their college careers. Each student will be assigned an individual advisor who will assist in formulating the specific ad hoc major program designed to attain the desired educational objectives. The department can be contacted at 646-660-6200.

The Weissman School of Arts and Sciences ad hoc major requires 30 – 33 credits.

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## The Minors

Chemistry

Natural Sciences

Interdisciplinary Minor in Environmental Sustainability

Physics

### Chemistry

Students may wish to minor in chemistry in order to pursue general intellectual interests or specific career objectives. For example, students can complete the chemistry courses required for admission to medical school by doing a minor in chemistry. The chemistry minor will consist of two chemistry courses at the 3000-level or above, followed by a capstone course at the 4000-level. The capstone course must be taken at Baruch College. All chemistry courses at the 4000-level or above (including independent study and honors) offered by the Department of Natural Sciences may serve as the capstone. Interested students should contact the department.

Examples of possible course sequences in the chemistry minor:

#### Biochemistry

CHM 3001 General Chemistry II

CHM 3003 Principles of Organic Chemistry I

CHM 4900 Biochemistry (co-requisite of CHM 3006—Principles of Organic Chemistry II)

#### Medicinal Chemistry

CHM 3001 General Chemistry II

CHM 3003 Principles of Organic Chemistry I

CHM 4010 Medicinal Chemistry (co-requisite of CHM 3006—Principles of Organic Chemistry II)

### Natural Sciences Minor

Students may wish to minor in natural sciences in order to pursue general intellectual interests or specific career objectives. For example, students can complete some of the science courses required for admission to medical school by doing a minor in natural sciences. For the natural sciences minor, students take two natural sciences courses at the 3000 level or above, followed by a capstone course at the 4000 level. The capstone course must be taken at Baruch College. All 4000- level courses offered by the Department of Natural Sciences or an independent studies course may serve as the capstone. Interested students should contact the department.

## Interdisciplinary Minor in Environmental Sustainability

The Department of Natural Sciences, the Weissman School of Arts and Sciences, and the Zicklin School of Business offer a joint interdisciplinary program in environmental sustainability. This minor is suitable for both business and liberal arts students who have an interest in developing a critical understanding of interactions between human society and the broader global ecosystem. The program emphasizes economic, legal, and philosophical issues of environmental sustainability.

The prerequisite to this minor is completion of one of the following options: **1)** ENV 1020; or **2)** ENV 1003L *and* ENV 1004; or **3)** BIO 1003; or **4)** BIO 1015 *and* BIO 1016; or **5)** BIO 3001.

To complete the minor in environmental sustainability (11--12 credits) students must take one course at the 3000-level or above in environmental studies (ENV) offered by the Department of Natural Sciences, any other course from the electives listed below, and a required capstone course (ENV 4005 or 4900).

**Program Prerequisite**

| | | |
|---|---|---|
| ENV 1020 | Principles of Ecology | 4 credits |
| *or* | | |
| ENV 1003L | Fundamentals of Ecology | 3 credits |
| ENV 1004 | Fundamentals of Ecological Research | 3 credits |
| *or* | | |
| BIO 1003 | Survey of the Living World | 4 credits |
| *or* | | |
| BIO 1015L | Fundamentals of Biology - Genetics, Evolution, and Ecology | 3 credits |
| BIO 1016 | Fundamentals of Biology - Laboratory Research in Genetics, Evolution, and Ecology | 3 credits |
| *or* | | |
| BIO 3001 | Principles of Biology II | 4.5 credits |

**Required Capstone Course**

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|---|---|---|
| ENV 4005 | Ecosystem Sustainability | 4 credits |

***or***

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|---|---|---|
| ENV 4900 | Topics in Environmental Science | 4 credits |

**Electives**

| | | |
|---|---|---|
| BIO 3009 | Conservation Biology and Sustainable Development ( ENV 3009) | 4.5 credits |
| BIO 3016 | Environmental Modeling ( ENV 3016) | 4 credits |
| BIO 3020 | Biology of Invertebrates ( ENV 3020) | 4 credits |
| BIO 3030 | History and Evolution of Life ( ENV 3030)<br>***effective spring 2019*** *course title changes to:* **Principles of Evolution: Processes, Patterns, and the History of Life** | 4 credits |

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|---|---|---|
| BIO 3040 | Plants in Action | 4 credits |
| BIO 3050 | Freshwater Ecology ( ENV 3050) | 4 credits |
| CIS 3700 | Green IT | 3 credits |
| ENV 3001 | Introduction to Environmental Science | 4 credits |
| ENV 3002 | Energy Conservation | 4 credits |
| ENV 3003 | Human Conservation | 4 credits |
| ENV 3005 | Economic and Legal Aspects of Ecology | 4 credits |
| ENV 3008 | Air and Water Pollution | 4 credits |
| ENV 3015/<br>ENV 3015 | Tropical Reef Ecology (Lecture and Lab) | 4 credits |
| ECO 3511 | Contemporary Economic Development | 3 credits |
| GEOG 3009 | Introduction to Human Geography ( ANT 3009) | 3 credits |
| GEOG 3036 | World Regional Geography ( ANT 3036) | 3 credits |
| JRN 3800 | Environmental Reporting | 3 credits |
| LAW 3122 | Law and the Environment | 3 credits |
| LAW 3400 | Law, Business and Sustainability | 3 credits |
| PAF 3442 | The Environment, Political Choices, and Public Policy | 3 credits |
| PHI 3200 | Environmental Ethics | 3 credits |
| POL 3317 | The Politics of Energy and the Environment | 3 credits |
| PSY 3185 | Environmental Psychology | 3 credits |

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## Physics

The physics minor is suitable for students with an interest in the application of mathematical tools to fundamental scientific laws. The program emphasizes both mathematical ideas and classic experiments. To satisfy the minor, students must take three courses, two at the 3000-level or above, and a capstone at the 4000-level or above.

**Tracks <u>are not</u> required, but examples of possible course sequences in the physics minor are:**

***Biomedical Track***

- PHY 3001 General Physics II
- PHY 3500 Biological Applications to Physics
- PHY 4130 Modern Physics

*Astrophysics Track*

- PHY 3010 Quantitative Physics I
- PHY 3020 Quantitative Physics II
- PHY 4201 Astrophysics

*Particle Physics Track*

- PHY 3010 Quantitative Physics I
- PHY 3020 Quantitative Physics II
- PHY 4140 Nuclear and Particle Physics

*Computational Physics and Finance Track*

- PHY 3004 Physics on the Computer with Python
- PHY 3020 Quantitative Physics II
- PHY 4004 Statistical Physics with Applications to Mathematical Finance

*Theoretical Physics Track*

- PHY 3010 Quantitative Physics I
- PHY 3020 Quantitative Physics II
- PHY 3200 Methods of Theoretical Physics - *Recommended*
- PHY 4130 Modern Physics

**Students are free to construct their own minor from any set of three physics courses satisfying the general conditions for the minor. Physics courses at the 3000-level or higher at Baruch College include:**

| | |
|---|---|
| PHY 3001 | General Physics II<br>(Not open to students who have completed PHY 3006, PHY 3010 and/or PHY 3020) |
| PHY 3004 | Physics on the Computer with Python<br><br>(Not open to student who have completed PHY 3001 or PHY 3010) |
| PHY 3010 | Quantitative Physics I [recommended]<br>(Not open to students who have completed PHY 2003, PHY 3001, and/or PHY 3004) |
| PHY 3020 | Quantitative Physics II [recommended]<br>(Not open to students who have completed PHY 3001) |
| PHY 3200 | Methods of Theoretical Physics |
| PHY 4004 | Statistical Physics with Applications to Mathematical Finance |
| PHY 4130 | Modern Physics |
| PHY 4140 | Introduction to Nuclear and Particle Physics |
| PHY 4201 | Astrophysics |
| PHY 5000-5004 | Independent Study |
| PHY 6001H-6002H | Honors |

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| **Recommended Courses in the Department of Mathematics** *Students are encouraged to take each of the following courses:* | |
| MTH 2610 | Calculus I |
| MTH 3010 | Elementary Calculus II |
| MTH 3020 | Intermediate Calculus |

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### Natural Sciences Laboratory Equipment

Facilities for advanced studies in biology, chemistry, and physics are available on the Baruch campus. In addition to equipment standard to biology research, the Department of Natural Sciences has laboratories equipped for microbiology and microbial ecology, cell biology, ecology, and physiology.

A student research lab offers incubators, microscopes, balances, centrifuges, growth chambers, and water baths to permit a wide range of research. Computers for data analysis and presentation design are also available. Faculty research labs are dedicated to specific areas of inquiry: cell-cell communication, molecular systematics and evolutionary biology, and microbial ecology. Research facilities are available for prokaryotic and eukaryotic cell culture, growth and maintenance of various plant and invertebrate animal species, histology, video microscopy, DNA amplification, cell fractionation, and various standard biochemical techniques, including UV/visible spectroscopy, electrophoresis, and chromatography.

Laboratories in chemistry are equipped for specific areas of experimentation: general chemistry, environmental chemistry, organic chemistry, and organic synthesis (electrochemistry apparatus, dissolved oxygen meters, atomic absorption apparatus, and instruments for nuclear magnetic resonance, gas chromatography/mass spectroscopy, high-performance liquid chromatography, UV/visible spectroscopy, and infrared spectroscopy).

The physics area has a special computer lab for student research and a faculty laser optics research lab.

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### Courses

#### Courses in Biology (BIO)

| | | |
|---|---|---|
| BIO 1003 | Survey of the Living World | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 1005 | General Biology - Structure and Function - A Human Orientation | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 1011L | Fundamentals of Biology: Human Biology Lecture | 2 lecture, 1 recitation; 3 credits |
| BIO 1012 | Fundamentals of Biology: Human Biology Laboratory | 3 hours; 3 credits |
| BIO 1015L | Fundamentals of Biology - Genetics, Evolution, and Ecology | 2 lecture, 1 recitation; 3 credits |
| BIO 1016 | Fundamentals of Biology - Laboratory Research in Genetics, Evolution, and Ecology | 3 hours; 3 credits |
| BIO 2010 | Principles of Biology I | 2 lecture hours; 1 recitation hour; 3 lab hours; 4.5 credits |
| BIO 2030 | Population Biology: Evolution Ecology | 2 lecture hours; 3 lab. hours; 1 recitation hour; 4.5 credits |
| BIO 2100 | Biostatistics ( ENV 2100) | 2 lecture hours; 2 lab hours; 3 credits |
| BIO 3001 | Principles of Biology II | 6 hours; 4.5 credits |

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| BIO 3002 | Reading Science | 1 hour; 1 credit |
| BIO 3005 | Molecular and Cellular Biology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3009 | Conservation Biology and Sustainable Development ( ENV 3009) | 2 lecture hours; 1 recitation hour; 3 lab hours; 4.5 credits |
| BIO 3010 | Comparative Vertebrate Anatomy | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3011 | Developmental Biology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3012 | Endocrinology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3015 | Principles of Genetics | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3016 | Environmental Modeling ( ENV 3016) | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 3020 | Biology of Invertebrates ( ENV 3020) | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 3025 | Human Physiology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 3030 | -History and Evolution of Life ( ENV 3030)<br>***effective spring 2019*** *course title changes to:* **Principles of Evolution: Processes, Patterns, and the History of Life** | 2 lecture hours; 1 recitation hour; 2 lab. hours; 4 credits |
| BIO 3035 | Introduction to Molecular Biotechnology | 2 lecture hours; 4 lab hours |
| BIO 3040 | Plants in Action | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 3050 | Freshwater Ecology ( ENV 3050) | 2 lecture hours; 4 lab hours; 4 credits |
| BIO 4004 | Microbiology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 4010 | Human Physiology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 4015 | Development Biology | 2 lecture hours; 4 lab. hours; 4 credits |
| BIO 5000 | Independent Study I | Hours and credits to be arranged |
| BIO 5001 | Independent Study II | Hours and credits to be arranged |
| BIO 5052 | Special Problems | 4 hours; 4 credits |
| BIO 5053 | Special Problems | 4 hours; 4 credits |
| BIO 6001H | Biology Honors I | Hours to be arranged; usually 4 credits per semester |
| BIO 6002H | Biology Honors II | Hours to be arranged; usually 4 credits per semester |
| BIO 6003H | Biology Honors III | Hours to be arranged; usually 4 credits per semester |

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## Courses in Chemistry (CHM)

| | | |
|---|---|---|
| CHM 1000 | Chemistry and the Environment | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 1003L | Fundamentals of Chemistry | 3 hours; 3 credits |

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| CHM 1004 | Fundamentals of Chemical Laboratory Techniques | 3 hours; 3 credits |
| CHM 1005 | Select Topics in Chemistry | 1 hour; 1 credit |
| CHM 2003 | General Chemistry I | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 3001 | General Chemistry II | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 3003 | Principles of Organic Chemistry I | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 3006 | Principles of Organic Chemistry II | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 4003 | Physical Chemistry I | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 4004 | Physical Chemistry II | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 4010 | Medicinal Chemistry | 3 lecture hours; 3 lab hours; 4.5 credits |
| CHM 4900 | Biochemistry | 2 lecture hours; 4 lab. hours; 4 credits |
| CHM 5000 | Independent Study I | Hours to be arranged; usually 4 credits per semester |
| CHM 5001 | Independent Study II | Hours to be arranged; usually 4 credits per semester |
| CHM 5002 | Independent Study III | Hours to be arranged; usually 4 credits per semester |
| CHM 6001H | Honors Chemistry I | 4 hours; 4 credits |
| CHM 6002H | Honors Chemistry II | 4 hours; 4 credits |
| CHM 6003H | Honors Chemistry III | 4 hours; 4 credits |

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## Courses in Environmental Science (ENV)

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|---|---|---|
| ENV 1003L | Fundamentals of Ecology | 3 hours; 3 credits |
| ENV 1004 | Fundamentals of Ecological Research | 3 hours; 3 credits |
| ENV 1020 | Principles of Ecology | 2 lecture hours; 4 lab. and field hours; 4 credits |
| ENV 1021 | Environmental Conservation | 2 lecture hours; 4 lab. and field hours; 4 credits |
| ENV 2100 | Biostatistics ( BIO 2100) | 2 lecture hours; 2 lab hours; 3 credits |
| ENV 3001 | Introduction to Environmental Science | 3 lecture hours; 2 lab. hours; 4 credits |
| ENV 3002 | Energy Conservation | 3 lecture hours; 2 lab. hours; 4 credits |
| ENV 3003 | Human Conservation | 3 lecture hours; 2 lab. hours; 4 credits |
| ENV 3005 | Economic and Legal Aspects of Ecology | 3 lecture hours; 2 lab. hours; 4 credits |
| ENV 3006 | Global Ecology | 3 lecture hours; 2 lab. hours; 4 credits |
| ENV 3008 | Air and Water Pollution | 3 lecture hours; 2 lab. hours; 4 credits |

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| ENV 3009 | Conservation Biology and Sustainable Development ( BIO 3009) | 2 lecture hours; 1 recitation hour; 3 lab hours; 4.5 credits |
| ENV 3015 | Tropical Reef Ecology Laboratory | 4 lab hours; 0 credits |
| ENV 3015L | Tropical Reef Ecology | 3 credits; 1 lecture hour |
| ENV 3016 | Environmental Modeling ( BIO 3016) | 2 lecture hours; 4 lab hours; 4 credits |
| ENV 3020 | Biology of Invertebrates ( BIO 3020) | 2 lecture hours; 4 lab hours; 4 credits |
| ENV 3030 | History and Evolution of Life ( BIO 3030)<br>***effective spring 2019*** *course title changes to:* **Principles of Evolution: Processes, Patterns, and the History of Life** | 2 lecture hours; 1 recitation hour; 2 lab. hours; 4 credits |
| ENV 3050 | Freshwater Ecology ( BIO 3050) | 2 lecture hours; 4 lab hours; 4 credits |
| ENV 4005 | Ecosystem Sustainability | 3 lecture hours; 2 lab hours; 4 credits |
| ENV 4020 | Microbial Ecology | 2 lecture hours; 4 lab. hours; 4 credits |
| ENV 4900 | Topics in Environmental Science | 3 lecture hours; 2 lab hours; 4 credits |
| ENV 5000 | Independent Study I | Hours and credits to be arranged |
| ENV 5001 | Independent Study II | Hours and credits to be arranged |
| ENV 5002 | Independent Study III | Hours and credits to be arranged |
| ENV 3015L | Tropical Reef Ecology Laboratory | 4 lab hours; 0 credits |
| ENV 6001H | Hon Env Stud I | Hours to be arranged; usually 4 credits per semester |
| ENV 6002H | Hon Env Stud II | Hours to be arranged; usually 4 credits per semester |

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## Courses in Physics (PHY)

| | | |
|---|---|---|
| PHY 1003 | Concepts in Physics | 3 lecture hours; 1 recitation hour; 2 lab hours; 4 credits |
| PHY 2001 | Fundamentals of Experimental Physics | 3 hours; 3 credits |
| PHY 2002L | Fundamentals of Physics: Theory and Practice | 3 hours; 3 credits |
| PHY 2003 | General Physics I | 3 lecture hours; 1 recitation hour; 2 lab. hours; 4 credits |
| PHY 2005 | Hyper complex Numbers with Applications in Physics | 2 lecture hours; 1 recitation hour; 2 computer workshop hours; 4 credits |
| PHY 3001 | General Physics II | 3 lecture hours; 1 recitation hour; 2 lab. hours; 4 credits |
| PHY 3004 | Physics on the Computer with Python | 3 lecture courses; 3 lab hours; 4 credits |
| PHY 3010 | Quantitative Physics I | 4 lecture hours; 2 lab hours; 5 credits |
| PHY 3020 | Quantitative Physics II | 4 lecture hours; 2 lab hours; 5 credits |

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| PHY 3200 | Methods of Theoretical Physics | 3 hours; 3 credits |
| PHY 3500 | Biological Applications of Physics | 6 hours; 4 credits |
| PHY 4004 | Statistical Physics with Applications to Mathematical Finance | 3 lecture hours; 3 lab hours; 4 credits |
| PHY 4130 | Modern Physics | 3 lecture hours; 3 lab hours; 4 credits |
| PHY 4140 | Introduction to Nuclear and Particle Physics | 3 hours; 3 credits |
| PHY 4200 | Astrophysics | 3 lecture hours; 1.5 lab hours; 1.5 field excursion hours; 4 credits |
| PHY 5000 | Independent Study I | Hours and credits to be arranged |
| PHY 5001 | Independent Study II | Hours and credits to be arranged |
| PHY 5002 | Independent Study III | Hours and credits to be arranged |
| PHY 6001H | Honors Physics I | Hours to be arranged; usually 4 credits per semester |
| PHY 6002H | Honors Physics II | Hours to be arranged; usually 4 credits per semester |

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