

ENVIRONMENTAL STUDIES, BACHELOR OF SCIENCE (B.S.)

The Bachelor of Science in Environmental Studies requires a minimum of 120 credits.

Along with the general education requirements of VCU Life Sciences, this curriculum requires 32-33 credits in core science and mathematics courses and 37-38 credits in environmental studies core courses.

Student learning outcomes

Upon completing this program, students will be able to demonstrate the following:

- Relate the principles and interconnections of environmental science and policy
- Demonstrate the ability to use basic environmental skills within the research processes
- Demonstrate a knowledge of basic biological concepts and their integration
- Demonstrate a knowledge of basic ecological concepts and integration
- Demonstrate a knowledge of basic earth science concepts and their integration

Special requirements

The Bachelor of Science in Environmental Studies requires a minimum 2.0 cumulative average in all major course work and a minimum of 34 credits of upper-level (e.g., 3XX, 4XX, or 5XX) approved courses. To meet the University Core capstone (Tier III) requirement, students are required to complete ENVS 499 and an additional course as approved by the unit. This additional course credit will count toward the electives for this major.

Degree requirements for Environmental Studies, Bachelor of Science (B.S.)

| Course | Title | Hours |
|---|---|-------|
| General education (http://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/) | | |
| Select 12-13 credits from general education foundations and 17-18 credits from areas of inquiry. | | 30 |
| Major requirements | | |
| • Major core requirements | | |
| BIOL 152 & BIOZ 152 | Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II | 4 |
| BIOL 317 | Ecology | 3 |
| CHEM 102 & CHEZ 102 | General Chemistry II and General Chemistry Laboratory II | 4 |
| ECON 325 | Environmental Economics | 3 |
| ENVS 101 | Introduction to Environmental Studies I | 3 |
| ENVS 102 | Introduction to Environmental Studies II | 3 |
| ENVS 222 | Electronic Portfolios | 1 |
| ENVS/POLI 311 | Politics of the Environment | 3 |
| ENVS 321 | Cartography | 3 |

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|----------|---|---|
| ENVS 330 | Environmental Pollution | 3 |
| ENVS 343 | Data Literacy | 4 |
| ENVS 355 | Water | 3 |
| ENVS 401 | Meteorology and Climatology | 3 |
| ENVS 499 | Environmental Studies Capstone Experience | 0 |

• Additional major requirements

| | | |
|-------------------------|--|---|
| ENVS 105 or URSP 204 | Physical Geology Physical Geography | 3 |
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• Major electives

| | |
|-------------------------|----|
| Select from list below. | 12 |
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Ancillary requirements

| | | |
|---------------------|---|---|
| BIOL 151 & BIOZ 151 | Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I | 4 |
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| CHEM 101 | General Chemistry I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) | 3 |
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| CHEZ 101 | General Chemistry Laboratory I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) | 1 |
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| MATH 151 | Precalculus Mathematics (satisfies general education quantitative foundations) | 4 |
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|-------------------------|---|-----|
| PHYS 201 or PHYS 207 | General Physics I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) University Physics I | 4-5 |
|-------------------------|---|-----|

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|-------------------------|--|---|
| STAT 210 or STAT 212 | Basic Practice of Statistics Concepts of Statistics | 3 |
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Open electives

| | |
|--------------------|----|
| Select any course. | 28 |
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|-------------|-----|
| Total Hours | 120 |
|-------------|-----|

The minimum number of credit hours required for this degree is 120.

Possible major electives

Select any ENVS or ENVZ course or choose from the courses listed below.

| Course | Title | Hours |
|----------|--------------------------------|-------|
| BIOL 103 | Global Environmental Biology | 4 |
| BIOL 307 | Aquatic Ecology | 3 |
| BIOL 312 | Invertebrate Zoology | 3 |
| BIOL 313 | Vertebrate Natural History | 3 |
| BIOL 314 | Animal Reproduction | 3 |
| BIOL 320 | Biology of the Seed Plant | 4 |
| BIOL 321 | Plant Development | 3 |
| BIOL 322 | Economic Botany | 3 |
| BIOL 324 | Medicinal Botany | 3 |
| BIOL 332 | Environmental Pollution | 3 |
| BIOL 333 | Evolution of the Angiosperms | 3 |
| BIOL 335 | Global Change Biology | 3 |
| BIOL 402 | Comparative Vertebrate Anatomy | 5 |

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| BIOL 403 | Primatology | 4 |
| BIOL 411 | Physiology | 3 |
| BIOL 415 | Mangrove Avian Field Ecology | 4 |
| BIOL 416 | Ornithology | 3 |
| BIOL 422 | Forest Ecology | 4 |
| BIOL 423 | Plant Physiology | 3 |
| BIOL 425 Play course video for Field Botany | Field Botany | 3 |
| BIOL 430 | Invasion Biology | 3 |
| BIOL 431 | Introduction to Marine Biology | 3 |
| BIOL 459 | Infectious Disease Ecology | 3 |
| BIOL 480 | Animal-Plant Interactions | 3 |
| BIOL 497 | Ecological Service Learning | 1 |
| BIOL 498 | Insects and Plants Service-learning | 2 |
| BIOL 507 | Aquatic Microbiology | 4 |
| BIOL 508 | Barrier Island Ecology | 3 |
| BIOL 510 | Conservation Biology | 3 |
| BIOL 512 | Plant Diversity and Evolution | 4 |
| BIOL 514 | Stream Ecology | 4 |
| BIOL 516 | Population Genetics | 3 |
| BIOL 518 | Plant Ecology | 4 |
| BIOL 519 | Forest Ecology | 4 |
| BIOL 520 | Population Ecology | 3 |
| BIOL 521 | Community Ecology | 3 |
| BIOL 522 | Evolution and Speciation | 3 |
| BIOL 535 | Wetlands Ecology | 4 |
| BIOL 545 | Biological Complexity | 3 |
| BIOL 550 | Ecological Genetics | 3 |
| BIOZ 307 | Aquatic Ecology Laboratory | 1 |
| BIOZ 312 | Invertebrate Zoology Laboratory | 1 |
| BIOZ 313 | Vertebrate Natural History Laboratory | 1 |
| BIOZ 317 | Ecology Laboratory | 2 |
| BIOZ 324 | Medicinal Botany Laboratory | 1 |
| BIOZ 416 | Ornithology Laboratory | 2 |
| ENGL 368 | Nature Writing | 3 |
| POLI 386 | Environmental Security | 3 |
| SOCY 350 | Environmental Sociology | 3 |
| SOCY 420 | Environmental Racism | 3 |
| URSP 332 | Environmental Management | 3 |
| URSP 545 | Sustainable Energy Policy and Planning | 3 |

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

Freshman year

| Fall semester | | Hours |
|---------------|---|-------|
| ENVS 101 | Introduction to Environmental Studies I | 3 |
| ENVS 222 | Electronic Portfolios | 1 |
| MATH 141 | Algebra with Applications | 4 |

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|---|--|----|
| UNIV 111 | Focused Inquiry I (satisfies general education UNIV foundations) | 3 |
| Play course video for Focused Inquiry I | | |
| General education courses | | 6 |
| Term Hours: | | 17 |

Spring semester

| | | |
|--|---|----|
| CHEM 101 & CHEZ 101 | General Chemistry I and General Chemistry Laboratory I (both satisfy general education BOK for natural sciences and AOI for scientific and logical reasoning) | 4 |
| ENVS 102 | Introduction to Environmental Studies II | 3 |
| MATH 151 | Precalculus Mathematics (satisfies general education quantitative foundations) | 4 |
| UNIV 112 | Focused Inquiry II (satisfies general education UNIV foundations) | 3 |
| Play course video for Focused Inquiry II | | |
| Term Hours: | | 14 |

Sophomore year

Fall semester

| | | |
|---------------------|---|----|
| BIOL 151 & BIOZ 151 | Introduction to Biological Sciences I and Introduction to Biological Science Laboratory I | 4 |
| CHEM 102 & CHEZ 102 | General Chemistry II and General Chemistry Laboratory II | 4 |
| UNIV 200 | Inquiry and the Craft of Argument (satisfies general education UNIV foundations) | 3 |
| Open elective | | 3 |
| Term Hours: | | 14 |

Spring semester

| | | |
|----------------------|---|----|
| BIOL 152 & BIOZ 152 | Introduction to Biological Sciences II and Introduction to Biological Science Laboratory II | 4 |
| ENVS 105 or URSP 204 | Physical Geology or Physical Geography | 3 |
| STAT 210 | Basic Practice of Statistics | 3 |
| Open electives | | 5 |
| Term Hours: | | 15 |

Junior year

Fall semester

| | | |
|---------------|---|----|
| BIOL 317 | Ecology | 3 |
| ENVS/POLI 311 | Politics of the Environment | 3 |
| ENVS 330 | Environmental Pollution | 3 |
| PHYS 201 | General Physics I (satisfies general education BOK for natural sciences and AOI for scientific and logical reasoning) | 4 |
| Open elective | | 2 |
| Term Hours: | | 15 |

Spring semester

| | | |
|----------|-------------|---|
| ENVS 321 | Cartography | 3 |
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|--------------------------|-------------------------|----|
| ECON 325 | Environmental Economics | 3 |
| ENVS 355 | Water | 3 |
| General education course | | 3 |
| Major electives | | 3 |
| Term Hours: | | 15 |

Senior year**Fall semester**

| | | |
|-----------------|---|----|
| ENVS 343 | Data Literacy | 4 |
| ENVS 499 | Environmental Studies Capstone Experience (taken with capstone appropriate corequisite) | 0 |
| Major electives | | 6 |
| Open electives | | 5 |
| Term Hours: | | 15 |

Spring semester

| | | |
|----------------|-----------------------------|-----|
| ENVS 401 | Meteorology and Climatology | 3 |
| Major elective | | 3 |
| Open electives | | 9 |
| Term Hours: | | 15 |
| Total Hours: | | 120 |

The minimum number of credit hours required for this degree is 120.

Accelerated B.S. and M.Envs.

The accelerated B.S. and M.Envs. program allows qualified students to earn both the B.S. in Environmental Studies and the Master of Environmental Studies in a minimum of five years by completing approved graduate courses during the senior year of their undergraduate program. Students in the program may count up to 12 hours of graduate courses toward both the B.S. and M.Envs. degrees. Thus, the two degrees may be earned with a minimum of 141 credits rather than the 153 credits necessary if the two degrees are pursued separately.

Admission to the program

Minimum qualifications for admittance to the program include completion of 90 undergraduate credit hours, an overall GPA of 3.0 and a GPA of 3.3 in courses required by the environmental studies major. Successful applicants would enter the accelerated program in the fall semester of their senior year.

Undergraduate students must have departmental approval to participate in an accelerated program and must apply for admission to the master's program prior to beginning their final year of full-time undergraduate study. The entry term for the master's program will be the next available admission term following the last semester of undergraduate study. Admission to the master's program is provisional until the undergraduate degree has been conferred. Upon completion and conferral of the undergraduate degree, students are fully admitted to the master's program.

It is recommended that candidates submit applications for admission to the accelerated program during the beginning of the spring semester of their junior year, but no later than Feb. 1. Two reference letters (at least one from an environmental studies faculty member) must accompany the application. Students who are interested in the accelerated program should consult with the program director to the master's program during

their junior year and before they have completed 90 credits toward the B.S. degree.

Once admitted into the accelerated program, students must meet the standards of performance applicable to graduate students as described in the "Satisfactory academic progress (<http://bulletin.vcu.edu/academic-regs/grad/satisfactory-academic-progress/>)" section of the Graduate Bulletin, including maintaining a 3.0 GPA. Guidance to students admitted to the accelerated program is provided by both the undergraduate environmental studies adviser and the faculty adviser to the graduate program.

Degree requirements

The Bachelor of Science in Environmental Studies degree will be awarded upon completion of a minimum of 120 credits and the satisfactory completion of all undergraduate degree requirements as stated in the Undergraduate Bulletin.

A maximum of 12 graduate credits may be taken prior to completion of the baccalaureate degree. Six of these graduate credits will be allowed to substitute for required undergraduate courses.

| Shared graduate class | Undergraduate requirements fulfilled | Credits |
|---|--------------------------------------|---------|
| ENVS 543 Environmental Data Literacy | ENVS 343 Data Literacy | 3 |
| ENVS 550 Ecological Risk Assessment | ENVS 330 Environmental Pollution | 3 |

The remaining six credits may be chosen from the approved list below. These courses are shared credits with the graduate program, meaning that they will be applied to both undergraduate and graduate degree requirements.

| Course | Title | Hours |
|----------|--|-------|
| ENVS 521 | Introduction to Geographic Information Systems | 3 |
| ENVS 591 | Topics in Environmental Studies | 1-4 |
| ENVS 601 | Survey in Environmental Studies | 3 |
| ENVS 603 | Environmental Research Methods | 3 |

Recommended course sequence/plan of study

What follows is the recommended plan of study for students interested in the accelerated program beginning in the fall of the junior year prior to admission to the accelerated program in the senior year. List of approved graduate electives are found on the graduate program bulletin for the M.Envs. program.

| Course | Title | Hours |
|--------------------|--|-------|
| Junior year | | |
| Fall semester | | |
| BIOL 317 | Ecology | 3 |
| ENVS 311 | Politics of the Environment | 3 |
| ENVS 330 | Environmental Pollution | 3 |
| ENVS 521 | Introduction to Geographic Information Systems | 3 |
| PHYS 201 | General Physics I | 4 |
| Term Hours: | | 16 |

| | | |
|---|---|----|
| Spring semester | | |
| ECON 325 | Environmental Economics | 3 |
| ENVS 543 | Environmental Data Literacy (satisfies ENVS 343 requirement) | 3 |
| Major elective | | 4 |
| Open electives | | 5 |
| Term Hours: | | 15 |
| Senior year | | |
| Fall semester | | |
| ENVS 499 | Environmental Studies Capstone Experience (taken with capstone appropriate corequisite) | 0 |
| ENVS 550 | Ecological Risk Assessment (satisfies ENVS 330 requirement) | 3 |
| ENVS 601 | Survey in Environmental Studies | 3 |
| Major electives | | 3 |
| Open electives | | 3 |
| University Core course (humanities/fine arts) | | 3 |
| Term Hours: | | 15 |
| Spring semester | | |
| ENVS 401 | Meteorology and Climatology | 3 |
| ENVS 411 | Oceanography | 3 |
| ENVS 603 | Environmental Research Methods | 3 |
| Open electives | | 6 |
| Term Hours: | | 15 |
| Fifth year | | |
| Fall semester | | |
| OVPR 601 | Scientific Integrity | 1 |
| ENVS 692 | Independent Study | 3 |
| or ENVS 693 | Internship in Environmental Studies | |
| Graduate electives (500 and 600 level) | | 8 |
| Term Hours: | | 12 |
| Spring semester | | |
| Graduate electives (500 or 600 level) | | 9 |
| Term Hours: | | 9 |

- Environmental Studies (ENVS) (p. 4)
- Life Sciences (LFSC) (p. 6)

Environmental Studies

ENVS 101. Introduction to Environmental Studies I. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Enrollment is restricted to environmental studies majors. Study of contemporary issues related to environmental studies including sustainability, biological conservation, global change and an overview of the core earth systems.

ENVS 102. Introduction to Environmental Studies II. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: ENVS 101 or permission of instructor. Enrollment is restricted to environmental studies majors. Studies of contemporary issues related to government policy and environmental issues at local to international scales.

ENVS 105. Physical Geology. 3 Hours.

Semester course; 3 lecture hours. 3 credits. A descriptive approach to physical geology dealing with the history and structure of the earth, catastrophic events and geology as it relates to the contemporary environment. An optional laboratory, ENVZ 105, may be taken with this course.

ENVS 201. Earth System Science. 3 Hours.

Semester course; 3 lecture hours. 3 credits. An introduction to the processes of and linkages among the major systems that drive planet Earth. The biosphere, geosphere, hydrosphere, atmosphere and sociosphere are presented as dynamic and interdependent systems.

ENVS 222. Electronic Portfolios. 1 Hour.

Semester course; 1 lecture hour (delivered online). 1 credit. This online course will guide individuals in developing an electronic portfolio consisting of student-curated collections of specific academic work, bibliographic information and a curriculum vitae used throughout their academic career. Graded as pass/fail.

ENVS 260. Outdoor Leadership. 3 Hours.

Semester course; 3 lecture hours. 3 credits. This course is designed to provide an introduction to the concepts and skills needed to work and lead teams in outdoor settings. Topics include the historical and philosophical foundations of outdoor leadership, outdoor teaching and facilitation, safety and risk management, and environmental stewardship. The course includes classroom and field application components.

ENVS 265. Paths to Environmental Leadership. 2 Hours.

Semester course; 2 lecture hours. 2 credits. Prerequisites: ENVS 101 and ENVS 102, both with a minimum grade of B. This course focuses on personal leadership development, leadership in the field of environmental studies, grant writing and revision, and the peer-review process. Discussions with guest speakers who are leaders in various environmental fields, additional readings and self-directed exploration of leadership figures will broaden our understanding of environmental leadership. Students will then use the Udall Undergraduate Scholarship application as a tool to begin to develop their own vision of environmental leadership and develop experience in grant writing and peer review.

ENVS 291. Special Topics in Environmental Studies. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated with different topics for a maximum of 12 credits. An introductory investigation into a selected topic salient to environmental studies. See the Schedule of Classes for specific topics being offered each semester.

ENVS 300. Sustainable Societies: James River Basin. 3 Hours.

Semester course; 3 lecture hours. 3 credits. This course explores the 25 most critical social, economic and environmental issues in the region in a global context. It examines how people are tackling the issues of sustainably and turning them into opportunities.

ENVS 301. Introduction to Meteorology. 3 Hours.

Semester course; 3 lecture hours. 3 credits. An introductory course designed to provide the student with an overview of the structures and processes that cause weather. These include atmospheric circulations and the weather patterns that we observe. Emphasis will be placed upon the tracking and display of weather phenomena, as well as their forecast movement and impact.

ENVS 310. Introduction to Oceanography. 3 Hours.

Semester course; 3 lecture hours. 3 credits. An introductory course designed to provide the student with an overview of the structures and processes of the world's oceans. These include the systems that impact the oceans: the hydrosphere, the atmosphere, the geosphere, the biosphere and the sociosphere. Emphasis will be placed upon hands-on techniques for understanding these systems, including online simulations and in-class activities.

ENVS 311. Politics of the Environment. 3 Hours.

Semester course; 3 lecture hours. 3 credits. An exploration of the current controversy about environmental politics and the issues and crises it centers on. Special attention will be given to the constitutional, political and geographical factors in the development of environmental policy and the organized effort to deal with governmental actions and inaction and its impact on policy outcomes. Crosslisted as: POLI 311.

ENVS 314. Man and Environment. 3 Hours.

Semester course; 3 lecture hours. 3 credits. A comparative study of the ecology and natural history of human populations, including the environments as determining factors in the evolution of human institutions and technology, resources management, and population crises; cultural traditions as mechanisms of population control; basic theory of population biology. Crosslisted as: INTL 314.

ENVS 315. Energy and the Environment. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Enrollment restricted to non-physics majors with junior or senior standing; not applicable to the physics major. A study of society's demands for energy, how it is currently being met, the environmental consequences thereof and some discussion of alternatives. Crosslisted as: PHYS 315.

ENVS 321. Cartography. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: MATH 131, STAT 208, or higher level MATH or STAT course. This course provides an introduction to the art and science behind the presentation of spatial information using maps and charts. Students will develop visual thinking and communication skills while applying cartographic theory to address contemporary practical problems. Students must have a laptop able to run ArcGIS Online.

ENVS 330. Environmental Pollution. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisites: BIOL 151 and BIOL 152. The study of pollution in the environment with emphasis on the procedures for detection and abatement.

ENVS 332. Environmental Management. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: URSP 204. An interdisciplinary review of domestic and international environmental problems and their underlying causes, current management frameworks, alternative management approaches and strategies, and barriers to their implementation. Other topics include: environmental history and economics, population growth, natural resources use, biodiversity, pollution. Crosslisted as: URSP 332.

ENVS 335. Environmental Geology. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: ENVS 105 or URSP 204. The relationship between humankind and the physical environment, earth materials and processes, geological hazards, water, mineral and energy resources, land use, and environmental health and law.

ENVS 343. Data Literacy. 4 Hours.

Semester course; 4 lecture hours. 4 credits. Prerequisite: STAT 210. This course takes a hands-on, collaborative approach for students to develop proficiency in the application of data management skills, static and dynamic data visualization, and quantitative analyses of environmental and geospatial datasets. Students will be required to bring their own laptop and analyses and visualization will be performed using the R statistical programming language.

ENVS 355. Water. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: BIOL 317 or ENVS 330 or permission of instructor. The course takes an ecosystem approach to understanding the functioning of streams, rivers, lakes, estuaries and oceans. The course complements curricula in biology and environmental studies and is specifically geared toward students with an interest in the water resources profession.

ENVS 360. Outdoor Programming and Event Management. 3 Hours.

Semester course; 3 lecture hours. 3 credits. This course is designed to provide students with information and practical experience required to successfully design, promote, implement and evaluate outdoor experiential programming across a range of contexts.

ENVS 361. Outdoor Team Building and Group Facilitation. 3 Hours.

Semester course; 3 lecture hours. 3 credits. This course is designed to provide students with the theory and practice of developing and deploying a successful outdoor recreational, educational, interpretive or adventure experience. In doing so, students will learn about group dynamics, team building, risk management and inquiry-based learning techniques.

ENVS 368. Nature Writing. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: ENGL 201, ENGL 202, ENGL 203, ENGL 204, ENGL 205, ENGL 206, ENGL 211, ENGL 215, ENGL 236, ENGL 250, ENGL 291, ENGL 295 or NEXT 240. A study of the literary genre of nature writing in English. Crosslisted as: ENGL 368.

ENVS 370. Applications of Conservation Science. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisites: ENVS 102; and STAT 210 or ENVS 343. The field of conservation science is focused on protecting biodiversity through the promotion of both social and ecological processes. This course will provide a foundation in the real-world applications of conservation science and demonstrate how data are essential to effective conservation of natural resources.

ENVS 391. Special Topics in Environmental Studies. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated with different topics for a maximum of 12 credits. A detailed investigation into a selected topic salient to environmental studies. See the Schedule of Classes for specific topics being offered each semester.

ENVS 401. Meteorology and Climatology. 3 Hours.

Semester course; 3 lecture hours. Prerequisite: PHYS 201 or PHYS 207. A basic, semiquantitative course in the elements of weather and climate, their driving forces and their spatial and temporal distribution and variability. Atmospheric motions and circulation, weather forecasting, human impact on weather and climate.

ENVS 411. Oceanography. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisites: BIOL 151, BIOL 152 and CHEM 102. A basic course in the physical, chemical and geological properties of oceans and ocean basins. Origin and character of ocean basins, properties of oceanic waters, oceanic circulation, land-sea interactions, marine environments and ecology.

ENVS 421. Environmental Data Visualization. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: STAT 314. This is an introductory course in using databases and geospatial technology. The course will introduce students to computer technology, project development and management skills, database management skills, and geospatial technology. Students will use in-class applied environmental analyses to guide skill-set development. The course will introduce the students to working with data in various formats and using the ArcGIS software suite to visualize the data. Students will be introduced to Microsoft Excel, Microsoft Access, ESRI ArcGIS software suite and ESRI ArcGIS Online.

ENVS 430. Invasive Species Management. 3 Hours.

Semester course; 1 lecture and 2 field experience hours. 3 credits. Prerequisite: BIOL 317. This course explores the ecological, political and regulatory issues surrounding invasive species in the city of Richmond and the commonwealth of Virginia. Students will be introduced to the James River Park System habitat restoration plan, a long-term strategy to manage non-native invasive species. Individuals will work directly with environmental professionals, park personnel and community partners to restore natural areas.

ENVS 460. Wilderness First Responder. 3 Hours.

Semester course; 3 lecture hours. 3 credits. This course is intended for anyone working in a position of leadership in an outdoor setting or for individuals who want a high level of wilderness medical training for working in remote field settings, extended personal backcountry trips or expeditions. The course is a comprehensive and in-depth look at the standards and skills of dealing with response and assessment, musculoskeletal injuries, environmental emergencies and survival skills, soft tissue injuries, and medical emergencies. Additional topics, such as CPR, are also included. Wilderness First Responder training is the industry standard for those who work as government and nongovernment field technicians, backcountry trip leaders, camp counselors, mountain guides, river guides and ski patrollers.

ENVS 461. Wilderness Policy and Practice. 3 Hours.

Semester course; 2 lecture and 1 field experience hours. 3 credits. This course takes a multidisciplinary and experiential look at the concept of wilderness. Learning spans from the classroom to a first-hand wilderness experience, and materials include environmental law, natural resources management, environmental philosophy and ethics, regional and local history, and conservation science. Throughout students will focus on the intersection between society, biodiversity and the wilderness concept in principle and practice.

ENVS 490. Research Seminar in Environmental Studies. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisites: senior standing and at least 12 hours of approved environmental studies course work. An interdisciplinary examination of problems and issues central to environmental studies. Environmental research of VCU faculty will be reviewed, and selected local environmental problems will be studied. Each student will complete a research project focusing on a specific environmental question.

ENVS 491. Topics in Environmental Studies. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated with different topics for a maximum of 12 credits. An in-depth study of a selected environmental topic. See the Schedule of Classes for specific topics to be offered each semester and prerequisites.

ENVS 492. Independent Study. 1-3 Hours.

Semester course; variable hours. Variable credit. Maximum of 3 credits per semester; maximum total of 6 credits for all topics courses. Prerequisite: junior or senior standing, and permission of instructor.

ENVS 493. Environmental Studies Internship. 1-3 Hours.

Semester course; variable hours. 1-3 credits per semester. Maximum total of 6 credits. Prerequisite: junior or senior standing, and permission of instructor. Graded as pass/fail.

ENVS 499. Environmental Studies Capstone Experience. 0 Hours.

Semester course; variable hours. 0 credits. Corequisite: ENVS 490, ENVS 491 (when topics implement core competencies required for a capstone experience and are approved by the director of the Center for Environmental Studies), ENVS 492 or ENVS 493. Enrollment restricted to students who have completed 90 hours of undergraduate course work. Any of the corequisite courses qualify as a capstone experience if taken with this course. Graded as pass/fail.

Life Sciences

LFSC 101. Academic and Career Options in Life Sciences. 1 Hour.

Semester course; 1 lecture hour. 1 credit. Students interested in the life sciences at VCU are faced with an enormous variety of academic options from bioinformatics and biomedical engineering to exercise science and nursing. Students outside of these programs have post-graduate opportunities in the life sciences, such as health care administration and government policy. This course will introduce students to an overview of all of the academic programs in life sciences available at VCU and their associated potential career options. Graded as pass/fail.

LFSC 191. Special Topics in Integrative Life Sciences. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated for credit with different topics. A 100-level study of a selected topic in integrative life sciences. Students will find specific topics and prerequisites for each special topics course listed in the Schedule of Classes. If multiple topics are offered, students may elect to take more than one.

LFSC 251. Phage Discovery I. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Corequisite: BIOL 151 or 152. An exploratory laboratory where students will purify phage from soil, visualize phage using electron microscopy and isolate genomic material for nucleic acid sequencing. Registration by override only. Crosslisted as: BNFO 251.

LFSC 252. Phage Discovery II. 2 Hours.

Semester course; 4 laboratory hours. 2 credits. Corequisite: BIOL 151 or 152. An exploratory laboratory where students will learn about the genomes of viruses infecting bacteria. Students will be given the genome sequence of a novel virus, which will be the basis for a series of computer-based analyses to understand the biology of the virus and to compare it with other viruses that infect the same host. Registration by override only. Crosslisted as: BNFO 252.

LFSC 301. Integrative Life Sciences Research. 3 Hours.

Semester course; 2 lecture and 1 recitation hours. 3 credits. Pre- or corequisite: UNIV 200 or HONR 200. Students will leave this course knowing enough about science and the process of science to feel confident in critically evaluating scientific information and/or embarking on their own process of discovery with a faculty mentor. They will gain an appreciation of the interdisciplinary and complex nature of life sciences and will hone their critical thinking about how science interacts with and informs society.

LFSC 307. Community Solutions: Multiple Perspectives. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: PSYC 101. Explores possibilities for addressing social concerns of the Richmond community by understanding the complex nature of social issues as essential to their successful amelioration via perspectives of life and social sciences. Toward this end, expertise from the social sciences, the life sciences and the community are integrated. Includes a service-learning experience (a 20-hour volunteer requirement). Crosslisted as: PSYC 307.

LFSC 391. Special Topics in Integrative Life Sciences. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated for credit with different topics. A 300-level study of a selected topic in integrative life sciences. Students will find specific topics and prerequisites for each special topics course listed in the Schedule of Classes. If multiple topics are offered, students may elect to take more than one.

LFSC 401. Faith and Life Sciences. 3 Hours.

Semester course; 3 lecture hours. 3 credits. Prerequisite: UNIV 200 or HONR 200. Open to students of any school or program. Explores the complex relationships between faith traditions and the life sciences. Topics include epistemology, impact of life sciences on ideas of fate and responsibility, limits of science and technology, and scientific and religious perspectives on human origins, consciousness, aggression, forgiveness, health, illness and death. Crosslisted as: RELS 401.

LFSC 491. Special Topics in Integrative Life Sciences. 1-4 Hours.

Semester course; 1-4 lecture hours. 1-4 credits. May be repeated for credit with different topics. A 400-level study of a selected topic in integrative life sciences. Students will find specific topics and prerequisites for each special topics course listed in the Schedule of Classes. If multiple topics are offered, students may elect to take more than one.