

DEPARTMENT OF ENVIRONMENTAL AND HEALTH SCIENCES

Bachelor of Arts: Biology: Field Naturalist, Outdoor Education

Bachelor of Science: Biology, Environmental Science/Natural Resources, Integrated Environmental Science, Health Sciences

Minors: Adventure Education, Biology, Chemistry, Environmental Education, Natural Resources

Teaching Licensure Programs: Life Science (7-12), Physical Education (K-6, 7-12, K-12), Physical Science (7-12)

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PLYMOUTH STATE UNIVERSITY RECIPROCAL AGREEMENT FOR ATHLETIC TRAINING CERTIFICATION

Johnson State College has a Reciprocal Agreement with Plymouth State University of New Hampshire whereby JSC graduates may be able to obtain athletic training certification (NATA). For specific information about this competitive program, please refer to the health science program information provided in this section of the catalog.

Bachelor's Degree Programs

BIOLOGY

The study of biology serves all college majors and professionals by preparing them to understand and deal with the many biological concepts, issues and problems in their fields. Our program is designed to introduce the core subdisciplines of biology and to offer advanced studies in organismal, human, molecular and environmental biology. Microbiologists, physiologists, zoologists, molecular biologists, field naturalists, ecologists, marine biologists, agricultural scientists, foresters, wildlife managers, physicians, therapists, nutritionists, toxicologists, science writers and teachers are a sample of the professionals who commonly begin as biology majors.

Students in the biology program explore outdoor laboratories ranging from the College's Babcock Nature Preserve to areas as diverse as tropical ecosystems and the American west. On campus, our program is supported by teaching laboratories, a greenhouse, an animal care facility, an artificial stream laboratory, a cellular and molecular laboratory, and extensive herbarium and vertebrate museum collections.

The research activity of the faculty include understanding cell behavior at the molecular level, classification of plants, improving teaching in biology, vertebrate ecology and studying environmental pollution.

• BACHELOR OF SCIENCE IN BIOLOGY

The B.S. program is designed for students who desire a comprehensive training in the life sciences leading to areas in education, research, or medicine. Students who complete the required education courses for secondary licensure are eligible to teach life sciences for grades 7-12 in the public schools.

Required Courses	Credits
BIO-1211 Introductory Biology: Ecology & Evolution+	4
BIO-1212 Introductory Biology: Cells & Genetic Basis of Life*+	4
BIO-2340 Fundamentals of Ecology*	4
BIO-3220 Genetics*	4
BIO-3720 Current Topics in Biology	1
BIO-4920 Senior Thesis	3
CHE-1031 General Chemistry I*+	4
CHE-1032 General Chemistry II*	4
CHE-3111 Organic Chemistry I*	4
CHE-3112 Organic Chemistry II*	4
MAT-1531 Calculus I*+	4
PHY-1041 Physics I*+	4

PHY-1042 Physics II* 4

Electives (Select a minimum of one course from each set)

Set 1: Mathematics

MAT-2030 Probability & Statistics+ 3
MAT-2532 Calculus II+ 4
MAT-XXXX Inferential Statistics 3

Set 2: Cell/Molecular Biology

BIO-3125 Introduction to Biological Chemistry 3
BIO-3130 Cellular Biology: A Molecular Approach* 4
BIO-3140 Microbiology* 4

Set 3: Organismal Biology

BIO-2011 Human Anatomy and Physiology I 4
BIO-2012 Human Anatomy and Physiology II 4
BIO-2145 Plant Biology 4
BIO-2310 Invertebrate and Vertebrate Zoology 4
BIO-3160 Animal Behavior 4
BIO-3170 Mammalogy 4
BIO-3320 Ornithology 4

Set 4: Ecology/Evolution

BIO-3260 Limnology 4
BIO-3270 Forest Ecology 4
BIO-3280 Environmental Toxicology* 4
BIO-3290 Conservation Biology 3

Total 62-64

*These courses also fulfill requirements in the ENV, HSC, OER, and WAM programs.

+These courses also fulfill the General Education Core Curriculum requirements.

Learning Outcomes for Biology Majors

The B.S. in the Biology Program seeks to produce graduates who:

- Demonstrate basic knowledge: Students will understand the fundamental concepts of each of the following biological disciplines and the relationships among them: organismal biology, ecology, cellular/molecular biology, and evolution.
- Apply the scientific method: Students will design and carry out a research study that incorporates the major steps in the scientific method of investigation.
- Communicate in science: Students will communicate effectively both in scientific writing and oral presentations.
- Have values and ethics: Students will apply ethical guidelines in professional and societal behavior.

• **BACHELOR OF ARTS IN BIOLOGY: FIELD NATURALIST**

The B.A. in Biology is designed for students who want to become a Field Naturalist. Field Naturalists have a broad knowledge of ecology, organismal biology, field geology, environmental chemistry, conservation biology, and wildlife management. Field Naturalist majors are particularly well qualified for environmental education and research positions for state or federal environmental conservation agencies, private conservation organizations, consulting firms, and environmental education institutions.

Required Courses	Credits
BIO-1211 Introductory Biology: Ecology & Evolution+	4
BIO-1212 Introductory Biology: Cells & Genetic Basis of Life+	4
BIO-2145 Plant Biology	4
BIO-2310 Invertebrate and Vertebrate Zoology	4
BIO-2340 Fundamentals of Ecology*	4
BIO-3720 Current Topics in Biology	1
BIO-4810 Internship in Biology	
or	3-12
BIO-4920 Senior Thesis	3
CHE-1031 General Chemistry I*+	4
CHE-1032 General Chemistry II*	4
ENV-1050 Introduction to Earth Science*+	4
ENV-1110 Introduction to Environmental Problems*	3
ENV-2050 The Natural History of Vermont*	3

Electives (select a minimum of 4 courses from the following)

BIO-3110 Field Ornithology* 3

BIO-3260 Limnology	4
BIO-3270 Forest Ecology	4
BIO-3290 Conservation Biology	3
BIO-3310 Wildlife Field Methods*	4
BIO-4220 Wildlife Ecology and Management*	4
ENV-3220 Environmental Interpretation*	3
GEY-3120 Field Geology*	4
Total	51-55

*These courses also fulfill requirements in the ENV, HSC, OER, and WAM programs.

+These courses also fulfill the Genreal Education Core Curriculum requirements.

Learning Outcomes for Field Naturalist Majors

The B.A. in the Field Naturalist Program seeks to produce graduates who:

- Critically read, evaluate, and synthesize information from relevant biological and environmental literature;
- Observe, identify, and measure the living and physical aspects of the natural environment using scientific methods; and
- Are able to articulate in written, oral, and graphical form the characteristics of natural environments and human interactions with them.

• LICENSURE IN LIFE SCIENCE (GRADES 7-12)

Students interested in obtaining licensure in life science must submit passing scores on Praxis I and II, complete the B.S. degree in biology and the following courses:

EDU-2110 Introduction to Exceptional Populations	3
EDU-2170 Adolescent Development	3
EDU-2320 Engaged in Creative Teaching and Learning	3
EDU-3020 Educational Psychology	3
EDU-3240 Literacy Development in the Content Areas	3
EDU-4850 Secondary Education Student Teaching	12
SCI-4020 Science Methods	3
Total	30

*Please see other important licensure requirements outlined on pages 28-32 of this catalogue.

Environmental Science

The environmental science discipline offers students both a natural resources program and an integrated science program. The environmental science: natural resources program prepares students for job opportunities in business, education and government, primarily in the management of natural resources and the development of public policy. The integrated environmental science program, by offering students a curriculum that focuses more heavily on laboratory and field courses, prepares students for more technically-orientated positions in the environmental field and for graduate programs in the sciences.

• BACHELOR OF SCIENCE IN ENVIRONMENTAL SCIENCE/ NATURAL RESOURCES

Required Core Courses	Credits
BIO-1210 Introduction to Biology	4
BIO-2340 Fundamentals of Ecology	4
CHE-1031 General Chemistry I	4
ENV-1050 Introduction to Earth Science	4
ENV-1110 Introduction to Environmental Problems	3
ENV-3030 Water Resources	3
ENV-3040 Energy and Mineral Resources	3
ENV-3210 Current Topics in Environmental Science	1
ENV-4730 Senior Seminar	3
Electives (Select five of the following)	
BIO-4220 Wildlife Ecology and Management	4
ENV-3010 Land Use Planning	3
ENV-3020 Environmental Law	3
ENV-3130 Environmental Geology	4
ENV-3150 Toxic and Solid Waste Management	3
ENV-3160 Coastal and Marine Resources	3
ENV-3220 Environmental Interpretation	3
ENV-3230 National Parks and Wilderness Management	3
ENV-3240 Fundamentals of Soil Science	4
ENV-3250 Meteorology/Climatology	4

ENV-3310 Applications in GIS	4
ENV-4010 Global Environmental Issues	3
ENV-4020 Remote Sensing	4
ENV-4810 Environmental Internship	6
GEY-3120 Field Geology	4
Additional Requirements	
ECO-2020 Macroeconomics	3
ECO-3010 Environmental Economics	3
PHI-1040 Introduction to Ethics	
or	3
POS-3050 Environmental Ethics and Politics	
POS-1020 American Politics and Government	
or	3
POS-1010 Introduction to Political Science	
Total Required in Major:	56-63

Students are encouraged, but not required, to complete an internship. Recent placements have included the Vermont Fish and Wildlife Department, U.S. Soil Conservation Service, U.S. Fish and Wildlife Service, the Vermont Youth Corps, Vermont State Legislature, regional planning commissions and various state and national parks.

Learning Outcomes for Environmental Science/Natural Resources Majors

The B.S. in Environmental Sciences/Natural Resources seeks to produce graduates who:

- Critically read, evaluate, and synthesize information from relevant geological and biological literature that addresses the complexity of factors relating to human interaction with the environment;
- Work individually, and with others, to evaluate the economic, social, ethical, and scientific aspects of environmental problems;
- Make observations and construct hypotheses to account for the observations; and
- Articulate, in oral, written, and graphical form (using computer software), the causes, scale, and relative importance of emergent and persistent environmental problems, environmental change, and sustainable human practices.

• BACHELOR OF SCIENCE IN INTEGRATED ENVIRONMENTAL SCIENCE

Required Core Courses	Credits
BIO-1210 Introduction to Biology	
or	4
BIO-1211 Introduction to Biology: Ecology and Evolution	
or	
BIO-1212 Introduction to Biology: Cells & The Genetic Bases of Life	4
BIO-2340 Fundamentals of Ecology	4
CHE-1031 General Chemistry I	4
CHE-1032 General Chemistry II	4
ENV-1050 Introduction to Earth Science	4
ENV-3240 Fundamentals of Soil Science	4
ENV-3250 Meteorology/Climatology	4
ENV-4720 Senior Thesis	3
GEY-3110 Hydrology	4
GEY-3120 Field Geology	4
PHY-1041 Physics I	4

Choose one course from each of the following sets of courses:

Set 1

ENV-3310 Applications in GIS	4
ENV-4020 Remote Sensing	4

Set 2

BIO-3130 Cellular Biology: A Molecular Approach	4
BIO-3140 Microbiology	4
CHE-3111 Organic Chemistry I	4

Set 3

BIO-3260 Limnology	4
BIO-3280 Environmental Toxicology	4
ENV-3130 Environmental Geology	4

Set 4

MAT-1531 Calculus I	4
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PHY-1042 Physics II	4
Total Required in Major:	59

Learning Outcomes for Integrated Environmental Science Majors

The B.S. in Integrated Environmental Science seeks to produce graduates who:

- Critically read, evaluate, and synthesize information from relevant geological, biological, and chemical literature related to environmental problems;
- Work individually, and with others, to identify and evaluate environmental problems;
- Apply appropriate tools, analytical equipment, and concepts from mathematics, physics, chemistry, geology, and biology, including the use of computer software, to evaluate environmental problems;
- Observe and measure in the field and laboratory, the organic, inorganic, and physical aspects of environmental problems while applying the methods of science;
- Design a research project to test hypotheses and draw conclusions based on knowledge of the sciences; and
- Articulate, in oral, written, and graphical form (using computers), assessments of environmental problems.

• LICENSURE IN PHYSICAL SCIENCE (GRADES 7-12)

Students interested in obtaining licensure in physical science must submit passing scores on Praxis I and II, complete the B.S. degree in environmental science or integrated environmental science and the following courses:

EDU-2110 Introduction to Exceptional Populations	3
EDU-2170 Adolescent Development	3
EDU-2320 Engaged in Creative Teaching and Learning	3
EDU-3020 Educational Psychology	3
EDU-3240 Literacy Development in Content Areas	3
EDU-4850 Secondary Education Student Teaching	12
SCI-4020 Science Methods	3

In addition, students are required to complete the following courses (some of which are required in the major):

CHE-1031 General Chemistry I	4
CHE-1032 General Chemistry II	4
PHY-1041 Physics I	4
PHY-1042 Physics II	4

*Please see other important licensure requirements outlined on pages 28-32 of this catalogue.

Health Sciences

• BACHELOR OF SCIENCE IN HEALTH SCIENCES

The health sciences major is designed for students wishing to pursue careers in health, fitness, and physical education. The program trains students in the basic sciences, including biology, chemistry, anatomy and physiology; assessment of health status; the disease process; health, fitness, and physical education; and cardiac and pulmonary assessment and rehabilitation. The health sciences program prepares students for a wide variety of career options and, with the current increases in lifestyle-related disease and the growing elderly population, students will be poised to take advantage of new prospects in the health field.

Core Program	Credits
AHS-1010 Contemporary Health Issues	3
AHS-2040 Advanced First Aid & Emergency Care	4
AHS-2130 Programs for Lifetime Health & Fitness	3
AHS-3120 Kinesiology	3
AHS-3230 Physiology of Exercise	4
AHS-4030 Psychology of Sports and Exercise	3
BIO-1210 Introduction to Biology	4
BIO-2011 Anatomy & Physiology I	4
BIO-2012 Anatomy & Physiology II	4
BIO-3180 Nutrition	3
PSY-1010 Introduction to Psychology	3

Health & Exercise Science Requirements

AHS-4060 Cardiopulmonary Assessment, Rehabilitation & Training	3
AHS-4110 Psychophysiology of Stress	3
AHS-4810 Internship or AHS 4xxx Senior Research	3-6
CHE-1031 General Chemistry I	4
CHE-1032 Chemistry II	4

Electives

In addition to completing the core program and health and exercise science requirements above, each student must choose two of the following courses in consultation with his/her advisor about career goals. At least one of these must be a 4-credit course.

Fitness Courses : 0.5 or 1.0 credits each

PED-1010	Aerobics, Water Aerobics, Weight Training, Weight Training for Women, Winter Sports Conditioning, Yoga, or AHS-1080 Lifetime Fitness	
AHS-3043	Care and Prevention of Athletic Injuries	4
AHS-3050	Introduction to Pharmacology	3
BIO-3125	Biological Chemistry (offered every 3 years)	4
BIO-3130	Cellular Biology: A Molecular Approach (offered every 3 years)	4
BIO-3140	Microbiology (offered every 3 years)	4
CHE-3111	Organic Chemistry I	4
Total:		61-65 Credits

(Total Exclusive of General Education Requirements 50-54 Cr.)

Note: Students interested in pursuing medical school following completion of their bachelor's degree should take these standard pre-requisite courses: BIO-1211 Introduction to Biology: Ecology and Evolution, BIO-1212 Introduction to Biology: Cells and Genetic Basis of Life, CHE-1031 General Chemistry I, CHE-1032 General Chemistry II, CHE-3111 Organic Chemistry I, CHE-3112 Organic Chemistry II, PHY-1041 Physics I, PHY-1042 Physics II. Required or suggested by some medical schools are the following courses: BIO-3125 Biological Chemistry, BIO-3220 Genetics, MAT-1531 Calculus I, MAT-2532 Calculus II.

Learning Outcomes for Health Science Majors

The B.S. in the Health Sciences Program seeks to produce graduates who:

- Demonstrate through both speaking and writing an understanding of biological, physical, and social sciences related to human movement, sport, exercise, and contemporary health issues.
- Identify and describe challenges to the natural homeostatic mechanisms of the body and mind and how both adapt to these challenges.
- Apply knowledge to prevent and control diseases in diverse populations related to lifestyle, behaviors, physical activity, and nutrition.
- Use both qualitative and quantitative methods to appraise risk factors, health status, fitness, and physical skills, and then design safe and effective programs to target these areas in various populations.
- Effectively communicate health, exercise, fitness, sport and physical activity information through a variety of teaching techniques.
- Demonstrate an ability to apply theoretical knowledge, research skills, use of technology, and professionally appropriate and ethical behaviors in workplace settings.

Athletic Training, A Reciprocal Agreement with Plymouth State University

Students who graduate from Johnson State College may obtain athletic training certification (NATA) through a reciprocal agreement with Plymouth State University of New Hampshire. Under this agreement Plymouth will accept up to two students per year who have an undergraduate degree from Johnson and who meet the entry standards for their Masters of Education Athletic Training. This academic program is competitive, limited, and is not guaranteed even to those who meet the minimum requirements. Students must verify that they can comply with the program's Technical Standards. A four-semester clinical experience is required as part of this program. Students successfully completing this program will be eligible to sit for the NATA-BOC certification exam. Plymouth State University's Athletic Training program has been granted accreditation by the Commission of Accreditation of Allied Health Education Programs (CAAHEP).

Students from Johnson interested in pursuing this reciprocal opportunity should work very closely with an academic advisor in the health science program at Johnson and include all or as many as possible of the following Johnson courses and internship hours in their undergraduate degree program:

Minimum of 100 hours observation under direct supervision of NATA-BOC Certified Athletic Trainer. Minimum grade of C in the following college/university courses:

Anatomy (w/lab) 4 credits
Physiology (w/lab) 4 credits
Kinesiology 3 credits
Exercise Physiology 3 credits
Nutrition 3 credits
Health Issues 3 credits
First Aid and CPR (and current certification) 4 credits

• LICENSURE IN PHYSICAL EDUCATION (GRADES K-6, 7-12, K-12)

All students pursuing licensure in Physical Education must complete the B.S. in Health Sciences core with the Physical Education concentration, and the appropriate licensure courses listed below. To be recommended for EDU-4835, Physical Education Practicum, students must pass Praxis I, have a GPA of 3.0 or better, and earn at least a B- in all licensure courses. Recommendation for Vermont teacher licensure requires a successful review of the student's professional portfolio and an overall GPA of at least a 3.0. Beginning October 2004, students applying for an initial licensure in physical education (K-6, 7-12, or K-12) must also submit passing scores on the Praxis II content knowledge examination.

Health Sciences Core	
AHS-1010 Contemporary Health Issues	3
AHS-2040 Advanced First Aid & Emergency Care	4
AHS-2130 Programs for Lifetime Health & Fitness	3
AHS-3120 Kinesiology	3
AHS-3230 Physiology of Exercise	4
AHS-4030 Psychology of Sports & Exercise	3
BIO-1210 Introduction to Biology	4
BIO-2011 Anatomy & Physiology I	4
BIO-2012 Anatomy & Physiology II	4
BIO-3180 Nutrition	3
PSY-1010 Introduction to Psychology	3
Physical Education Requirements	
DAN-1010 Fundamentals of Dance	3
OER-2140 Ropes Course Leadership	2
PED-1150 Foundations of Physical Education	3
PED-2030 Educational Games, Dance, & Gymnastics	2
PED-2040 Team Sports	2
PED-2110 Individual, Dual, & Lifetime Activities	2
PED-3120 Measurement & Evaluation	3
Choose 1 of the following in consultation with advisor: 3-4	
AHS-3043 Care & Prevention of Athletic Injuries	4
AHS-4110 Psychophysiology of Stress	3
OER-3010 Learning in the Outdoors	4
Licensure Requirements	
EDU-2040 Child Development (for K-6 licensure)	3
EDU-2110 Introduction to Exceptional Populations	3
EDU-2170 Adolescent Development (for 7-12 licensure)	3
EDU-2320 Engaged in Creative Teaching and Learning	3
EDU-3020 Educational Psychology	3
EDU-3120 Methods in Health & Physical Education for Elementary School Teachers (for K-6 licensure)	2
EDU-3240 Literacy Development in the Content Areas	3
EDU-4835 Physical Education Student Teaching	12
PED-2810 Internship in Elementary Physical Education (for K-6 licensure)	.5
PED-2810 Internship in Physical Education for Exceptional Populations	.5
PED-3140 Methods of Teaching Secondary School Physical Education (for 7-12 licensure)	4
Licensure Requirements Total for:	
Grades K-6 Licensure	30 credits
Grades 7-12 Licensure	31.5 credits
Grades K-12 Licensure	37 credits
TOTAL	89-97 credits

*Please see other important licensure requirements outlined on pages 28-32 of this catalog.
(Total Exclusive of General Education Requirements 75-83 credits)

Outdoor Education

• BACHELOR OF ARTS IN OUTDOOR EDUCATION

The outdoor education major is highly experiential and leads to diverse careers working with a variety of populations in outdoor settings. The program consists of a core and two concentrations: one in adventure education and wilderness leadership and the other in environmental education. The major offers students technical training in outdoor pursuits/adventure leadership and environmental education in combination with cross-disciplinary study in education, psychology and biology, and prepares students for a career or graduate study in outdoor education, outdoor recreation or environmental education.

Students must earn a grade of C- (1.7) or better in all required courses in the degree program. Prior to the required internship, students must complete OER-3010, have junior or senior standing, and obtain a recommendation from the outdoor education faculty. Students should meet with their advisors early in their program for specific details regarding the internship process.

Core Program	Credits
One of the following human development courses*:	3
EDU-2040 Child Development	
EDU-2170 Adolescent Development	
PSY-2070 Developmental Psychology	
EDU-3020 Educational Psychology	3
ENV-1110 Introduction to Environmental Problems	3
ENV-2050 The Natural History of Vermont	3
or	
BIO-2130 Natural History of the Yellowstone Plateau	3
OER-1000 Introduction to Outdoor Education	4
OER-3010 Learning in the Outdoors	4
OER-3020 Program Planning in Outdoor Education	3
OER-4900 Research in Outdoor Education	3
PSY-1010 Introductory Psychology	3

*Adventure Education and Wilderness Leadership majors must select either EDU-2170 or PSY-2070.

Internship	Credits
OER-4810 Outdoor Education Internship	6–12
Total	39–45

Adventure Education & Wilderness Leadership Concentration

Students in this concentration will be prepared for work in the fast-growing field of educational and recreational outdoor programs. Employers of these graduates might include adventure outfitters and guide services, outdoor education centers and camps that include programs in outdoor living/travel and ropes courses, and outdoor leadership development programs. Graduating students could also pursue advanced degrees in outdoor education, outdoor recreation or outdoor therapeutic recreation.

Students in this concentration must document at least 25 days of wilderness or adventure leadership experiences when they apply for their required internship. Leadership opportunities are offered through various courses, the Outing Club, and local schools and agencies. Students should consult with their advisor early in their program to obtain details about this requirement.

Outdoor Education	Credits
Activities (0.5-3.0 credits each)	4-10
Select six of the following:	
Backpacking, Advanced Backpacking, Flyfishing, Hiking & Camping, Rock Climbing I, Advanced Rock Craft, Ice Climbing, Orienteering, Ropes Course, Cross-Country Skiing, Snowshoeing, Introduction to River Kayaking, Whitewater Kayaking, Coastal Kayaking, Winter Expedition, Teaching Assistant Internship Winter Expedition, skills class Teaching Assistant Internship, or approved activity-based special topics course, such as OER-2XXX Wilderness Canoe Touring.	
OER-2050 Rock Climbing Instructor	2
or	
OER-2XXX Coastal Kayak Guide Training	2
OER-2060 Wilderness First Responder (or proof of equivalent or higher level certification)	4
OER-2140 Ropes Course Leadership	2
OER-3070 Adventure Education Theory and Practice	3
OER-4030 Wilderness Leadership Techniques	4
PSY-2420 Group Process: Theory and Practice	3
AEWL Concentration Total	22-28

Environmental Education Concentration

Students in this concentration will be prepared for employment in a variety of settings, including working at outdoor education, environmental, and nature centers; as naturalists or interpreters in federal, state, or local parks; conducting nature or environmentally-oriented activities for municipal or community recreation programs; as summer camp nature specialists; and as school and college workshop leaders and curriculum consultants. Students can also pursue advanced degrees in outdoor education and environmental education.

	Credits
BIO-1210 Introduction to Biology	4
or	
BIO-1211 Introduction to Biology: Ecology & Evolution	4
BIO-2340 Fundamentals of Ecology	4
ENV-1050 Introduction to Earth Science	4
ENV-3220 Environmental Interpretation	3
ENV-3230 National Parks and Wilderness Management	3
ENV-4010 Global Environmental Issues	3

Natural Science Field Course (choose one of the following):	3-4
BIO-2145 Plant Biology (4 cr)	
BIO-3110 Field Ornithology (3 cr)	
BIO-3310 Wildlife Field Methods (4 cr)	
GEY-3120 Field Geology (4 cr)	
EE Concentration Total	20-21

Learning Outcomes for Outdoor Education Majors

The B.A. in Outdoor Education Program seeks to produce graduates who can demonstrate:

- Knowledge of the historical and philosophical foundations of the field, human development, learning theories, experiential education, natural history, and environmental issues,
- The ability to critically read, evaluate, and synthesize literature in the field of outdoor education and carry out an original research project,
- Pedagogical skills and practical experience organizing, teaching and leading diverse populations through experiential, field-based learning opportunities,
- Knowledge of professional practices including program administration, program development, risk management, emergency procedures, and awareness of industry standards, current issues and trends,
- Knowledge and skills specific to outdoor adventure pursuits and/or environmental education.

Minors

• ADVENTURE EDUCATION

Required Courses	Credits
Minimum of Two OER activities (1000-level, 0.5-1.0 credit each)	1-2
Choice of: Snowshoeing, Cross-Country Skiing, Intro to River Kayaking, Flyfishing, Hiking & Camping, Backpacking, Rock Climbing, Ropes Course, Orienteering, Whitewater Kayaking, Coastal Kayaking, Ice Climbing	
Two OER activities (2000-3000 level, 2-3 credits each, at least one of which must be instructor-level)	4-5
Choice of: Advanced Backpacking, Advanced Rock Craft, Rock Climbing Instructor, Ropes Course Leadership, Paddling Instructor*, Winter Expedition	
OER-1000 Introduction to Outdoor Education	3-4
OER-2060 Wilderness First Responder	4
OER-3070 Adventure Education Theory & Practice	3
OER-4030 Wilderness Leadership Techniques	4
Total	20-22*

Occasional special topics course

• BIOLOGY

Required Courses	Credits
BIO-2145 Plant Biology	4
BIO-2310 Invertebrate and Vertebrate Zoology	4
BIO-2340 Fundamentals of Ecology	4
BIO-3130 Cellular Biology: A Molecular Approach	4
BIO-3220 Genetics	4
One additional upper-level BIO course	3-4
Total	23-24

• CHEMISTRY

Required Courses	Credits
CHE-1031 General Chemistry I	4
CHE-1032 General Chemistry II	4
CHE ----Two additional upper-level CHE courses	8
ENV-1110 Introduction to Environmental Problems	3
Total	19

A chemistry minor is not allowed for students who are seeking a B.S. degree in: 1) Integrated Environmental Science or 2) Biology.

• ENVIRONMENTAL EDUCATION

Required Courses	Credits
ENV-1050 Introduction to Earth Science	4
ENV-1110 Introduction to Environmental Problems	3

ENV-3220 Environmental Interpretation	3
ENV-4010 Global Environmental Issues	3
ENV- --- One additional upper-level ENV course	3
OER-3010 Learning in the Outdoors	4
Total	20

• **NATURAL RESOURCES**

Required Courses	Credits
ENV-1050 Introduction to Earth Science	4
ENV-1110 Introduction to Environmental Problems	3
ENV-3030 Water Resources	3
ENV-3040 Energy and Mineral Resources	3
ENV- --- Two additional upper-level ENV courses	6
Total	19

The Department of Environmental and Health Sciences offers courses with the following designators: AHS (allied health science), BIO (biology), CHE (chemistry), ENV (environmental science), GEY (geology) OER (outdoor education and recreation), PED (physical education), PHY (physics), and SCI (science). See full course descriptions beginning on page 65.

