

## Environmental Studies

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**David Bray**, Professor

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**Tom Pliske**, Instructor

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### Affiliated Faculty

**Elizabeth Anderson Olivas**, GLOWS Project

**William Anderson**, Earth Sciences

**Maria Aysa**, Sociology/Anthropology

**Bradley Bennett**, Biological Sciences

**Jerry Brown**, Sociology/Anthropology

**Yong Cai**, Chemistry

**Daniel Childers**, Biological Sciences

**Alice Clarke**, US Park Service

**Shlomi Dinar**, International Relations

**Maureen Donnelly**, Biological Sciences

**Jim Fourqurean**, Biological Sciences

**Jennifer (Zhaohui) Fu**, GIS-RS Center

**Evelyn Gaiser**, Biological Sciences

**Piero R. Gardinali**, Chemistry

**Jennifer Gebelein**, International Relations

**Michael Heithaus**, Biological Sciences

**Gail Hollander**, International Relations

**James Huchingson**, Religious Studies

**Rudolf Jaffe**, Chemistry

**Jeff Joens**, Chemistry

**B. M. Golam Kibria**, Statistics

**Suzanne Koptur**, Biological Sciences

**David Lee**, Biological Sciences

**Andrew Mathews**, Sociology/Anthropology

**Rod Neumann**, International Relations

**Michael Norland**, S. Fla Natural Resource Center

**Steve Oberbauer**, Biological Sciences

**George O'Brien**, Education

**Laura Ogden**, Sociology/Anthropology

**Kevin O'Shea**, Chemistry

**Tom Philippi**, Biological Sciences

**René Price**, Earth Sciences

**Stewart Reed**, US Department of Agriculture

**James Riach**, Adjunct Professor

**Laurie Richardson**, Biological Sciences

**Michael Sukop**, Earth Sciences

**Berrin Tansel**, Civil and Environmental Engineering

**Joel Trexler**, Biological Sciences

**Bill Vickers**, Sociology/Anthropology (Emeritus)

**Carlton Waterhouse**, Law

**Kevin Whelan**, US Geological Survey

**Yan Yan Zhou**, Statistics

This department prepares students to work in professions with an environmental focus. The Bachelor of Science degree emphasizes the chemical and ecological aspects of environmental analysis. The Bachelor of Arts degree is broader, with an emphasis on the political, social and economic aspects of environmental issues. This is an interdisciplinary program and faculty represent disciplines from chemistry to anthropology. It also relies upon affiliated faculty in other departments for some courses.

## Bachelor of Science in Environmental Studies

### Degree Program Hours: 120

To qualify for admission to the program, FIU undergraduates must have met all the lower division requirements including CLAST, completed 60 semester hours, and must be otherwise acceptable into the program.

### Lower Division Preparation

#### Required Courses

#### Common Prerequisites

BSC 1010	General Biology I
BSC 1010L	General Biology I Lab
BSC 1011	General Biology II
BSC 1011L	General Biology II Lab
CHM 1045	General Chemistry I
CHM 1045L	General Chemistry I Lab
CHM 1046	General Chemistry II
CHM 1046L	General Chemistry II Lab
GLY 1010	Introduction to Earth Science
GLY 1010L	Introduction to Earth Science Lab

**and**

EVR 3010	Energy Flow in Natural and Man-made Systems
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**or**

PHY 2023	Survey of General Physics
MAC 2132	Pre-Calculus Mathematics

**or**

MAC 1105	College Algebra
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**and**

MAC 1114	Trigonometry
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#### Lower or Upper Division Requirements

ECO 2023	Microeconomics	3
STA 3111	Statistics I	4
STA 3112	Statistics II	2
	<b>or</b>	
MAC 2311	Calculus I	4
CHM 2200	Survey of Organic Chemistry	3
CHM 2200L	Survey of Organic Chemistry Lab	1
	<b>or</b>	
CHM 2210	Organic Chemistry I	4
CHM 2210L	Organic Chemistry I Lab	1
	<b>and</b>	
CHM 2211	Organic Chemistry II	3
CHM 2211L	Organic Chemistry II Lab	1

### Upper Division Program

#### Recommended Courses

ANT 3403	Cultural Ecology	3
ENC 3211	Report and Technical Writing	3
POS 2042	American Government	3
	<b>or</b>	

POS 3424	Legislative Process	3
REL 3492	Earth Ethics	3
<b>Required Courses</b>		
ECP 3302	Introduction to Environmental Economics	3
EVR 4352	U.S. Environmental Policy	3
<b>or</b>		
PUP 4203	Environmental Politics	3
REL 3492	Earth Ethics	3
EVR 4211	Water Resources	3
EVR 4211L	Water Resources Lab	1
PCB 3043	Ecology	3
PCB 3043L	Ecology Lab	1
CHM 3120	Analytical Chemistry and	3
CHM 3120L	Analytical Chemistry Lab	1
<b>or</b>		
EVR 4323	Restoration Ecology and	3
EVR 4xxx	Restoration Ecology Lab	1
EVR 4920	Environmental Studies Seminar	1
EVR 4905	Independent Study	2
Two of the following four courses:		
EVR 4026	Ecology of Biotic Resources	3
EVR 4231	Air Resources	3
EVR 4310	Energy Resources	3
EVR 4592	Soils and Ecosystems and	3
EVR 4592L	Soils and Ecosystems Lab	1

Students are urged to develop an area of specialization of 12 to 15 credits, or a minor, in consultation with an advisor. An approved list of such courses are published prior to each semester.

**Total semester hours** 60

## Bachelor of Arts in Environmental Studies

**Degree Program Hours: 120**

### Lower Division Program

#### Recommended Courses

PSC 1515 Energy and the Natural Environment

To qualify for admission to the program, FIU undergraduates must have met all the lower division requirements including CLAST, completed 60 semester hours, and must be otherwise acceptable into the program.

#### Common Prerequisite

ECO 2023 Principles of Microeconomics

BSC 1011/1011L Organismal Biology and Lab

*One of the following:*

CHM 1032/1032L Chemistry & Society and Lab

GLY 1010/1010L Introduction to Earth Sciences and Lab

To qualify for admission to the program, FIU undergraduates must have met all the lower division requirements including CLAST, completed 60 semester hours, and must be otherwise acceptable into the program.

### Upper Division Program

#### Recommended Courses

ANT 3403	Cultural Ecology	3
ENC 3211	Report & Technical Writing	3
POS 2042	American Government	3
<b>or</b>		

POS 3424	Legislative Process	3
<b>Required Courses: (33)</b>		
EVR 3010	Energy Flow in Natural and Man-made Systems	3
EVR 3011	Environmental Resources and Pollution	3
EVR 3011L	Environmental Resources and Pollution Lab	1
EVR 4594	Analysis of South Florida Ecosystems	3
EVR 4596	Applied Field Ecology	2
EVR 4415	Population & Environment Issues	3
EVR 4352	US Environmental Policy	3
<b>or</b>		
PUP 4203	Environmental Politics	3
REL 3492	Earth Ethics	3
STA 3111	Statistics I	4
ECP 3302	Introduction to Environmental Economics	3
EVR 4411	Human Organization & Ecosystems Management	3
EVR 4905	Independent Study	2
EVR 4920	Environmental Seminar	1
EVR 4869L	Environmental Problem Solving Lab	2

### Area of Specialization Courses: (12)

The student must take at least twelve additional credits in an approved area of specialization, such as energy and resource management, human ecology, environmental education, environmental policy, international environmental issues, geography or ecology. Six of the 12 credits must be from EVR courses. **Note:** Minors may be substituted for an area of specialization.

Electives 16

**Total semester hours** 60

## Accelerated Master's of Science in Environmental Studies

### Admission Requirements

- Current enrollment in the Bachelor's Degree Program in EVR at FIU.
- Completed or enrolled in at least 90 undergraduate credit hours.
- Current GPA of 3.25 or higher.
- GRE combined score of 1000 (quantitative and verbal).

### General Requirements

- Completed Bachelor's Degree in EVR at FIU.
- EVR 5320 Environmental Resource Management can substitute for EVR 4023 Biotic Resources for BS majors and be taken as an elective/area of concentration by BA majors.
- BA and BS majors can take EVR 5355 Environmental Resource Policy instead of EVR 4352 US Environmental Policy.
- Two-Three graduate electives (6-9 credits) can be counted towards areas of concentration for BA majors, or as electives or resource courses for BS majors.
- Take one section of EVR Graduate Seminar for EVR 4920 Undergraduate Seminar.
- Students are expected to have 12-18 graduate course credits by the time they receive the undergraduate degree.

## Minor In Environmental Studies

### Required Courses

1. Four of the following approved courses, including at least two of the first four.

EVR 4026	Ecology of Biotic Resources	3
EVR 4211	Water Resources	3
EVR 4231	Air Resources	3
EVR 4310	Energy Resources	3
EVR 4401	Conservation Biology	3
EVR 4323	Restoration Ecology	3
2. One of the following courses:		
EVR 4415	Population and Environment Issues	3
EVR 4321	Sustainable Resource Development	3
EVR 4352	US Environmental Policy	3
Total Credits		15

Grades of 'C' or better required for all courses. A list of additional approved environmental science courses, subject to change, is available in the Department of Environmental Studies.

### Cooperative Education

Students seeking the baccalaureate degree in environmental studies may also take part in the Cooperative Education Program conducted in conjunction with the Department of Cooperative Education in the Division of Student Affairs. The student spends one or two semesters fully employed in industry or a governmental agency. For further information consult the Department of Cooperative Education.

### Environmental Internships

Students interested in job-related academic internships should enroll in the Environmental Studies office. For details on compensation, benefits, and academic credit, contact Dr. Jack Parker.

### Course Descriptions

(Course descriptions are also found in catalog sections of all participating departments. For assistance see an advisor.)

#### Definition of Prefixes

EVR-Environmental Studies.

F-Fall semester offering; S-Spring semester offering; SS-Summer semester offering.

#### EVR 1001 Introduction to Environmental Sciences (3).

A physical science course for non-science majors, emphasizing air and water pollution, water resources, solid waste management, and energy resources. (F,S, SS)

#### EVR 1001L Introduction to Environment Sciences Lab

(1). Laboratory analysis and field trips on topics and concepts covered in Introduction to Environmental Sciences. (F,S,SS)

#### EVR 1017 The Global Environment and Society (3).

A broad introduction to the impact of social and economic processes on the global environment, including historical and comparative dimension. (F, S)

#### EVR 3010 Energy Flow in Natural and Man-made Systems (3).

A course for non-science majors, examining energy use and efficiency, nuclear and renewable energy sources (including solar energy), and their environmental impacts. Prerequisites: College algebra or equivalent. (S)

#### EVR 3011 Environmental Resources and Pollution (3).

A course for non-science majors, focusing on dynamics of pollution and environmental toxicology with emphasis on energy consumption and production, solid wastes, and air and water resources. (F,S,SS)

#### EVR 3011L Environmental Science: Pollution Lab (1).

Laboratory and field analyses of topics and concepts covered in EVR 3011. Corequisite: EVR 3011. (F,S,SS)

#### EVR 3013 Ecology of South Florida (3) EVR 3013L Ecology of South Florida Lab (1).

A course for non-science majors, offering an introduction to the ecology of South Florida through lectures and a series of field trips into several unique ecosystems, such as the Everglades, hardwood hammocks, and coastal regions. The course also deals with natural resource conservation, wildlife management, endangered species, and wilderness issues. (F,S,SS)

**EVR 3029 The Everglades (3).** An interdisciplinary examination of the Everglades system, including natural history, human history, esthetics, and politics/policy of restoration.

**EVR 3402 Asian Environmental Issues (3)** An overview of emerging environmental issues in Asian countries. Discussion of cultural, economic, and political systems of the region and their influence on the environment.

**EVR 3931 Topics in Environmental Studies (3).** An intensive analysis of a current environmental topic. Course may be repeated with change in content.

**EVR 3949/EVR 4949 Cooperative Education in Environmental Studies (1-3).** One semester of full-time supervised work in an outside laboratory taking part in the University Co-op Program. Limited to students admitted to the Co-op Program. A written report and supervisor evaluations will be required of each student. (F,S,SS)

**EVR 4026 Ecology of Biotic Resources (3).** The study of renewable natural resources of the earth's biomes, particularly those of tropical forests, the factors influencing their productivity, conservation, and human use. Prerequisites: BSC 1010 and BSC 1011.

**EVR 4211 Water Resources (3).** A seminar dealing with various aspects of water use, water pollution problems, chemistry and ecology of South Florida's waters. Ecology is recommended. Prerequisites: CHM 1045 and CHM 1046 or equivalent and general biology. (F)

**EVR 4211L Water Resources Lab (1).** Laboratory course on procedures currently suitable and widely accepted for physical, chemical, and biological methods in the examination of water. Prerequisites: CHM 1045 and CHM 1046 or equivalent and General Biology.

**EVR 4231 Air Resources (3).** Common air pollutants - their sources and methods of control. Different legislative and administrative approaches will be studied. Prerequisites: CHM 1045 and CHM 1046 or equivalent. (S)

**EVR 4310 Energy Resources (3).** Seminar dealing with power and energy production in modern society, fundamental energy relationships of industrial and domestic processes. Prerequisites: EVR 3010 or PHY 2023 or equivalent. (S)

**EVR 4321 Sustainable Resource Development (3).** An overview of social, economic and ecological approaches to sustainable resource development. Examines various policies for harmonizing economic growth and environmental sustainability.

**EVR 4323 Restoration Ecology (3).** Principles and practices of environmental restoration, recreation and enhancement. Examines ecological theory that relates to restoration through case studies from southern Florida. Prerequisites: EVR 3013 or PCB 3043 or permission of the instructor.

**EVR 4351 U.S. Energy Policy (3).** Policies governing the utilization of energy in the U.S. Focuses on the physical, political and social constraints that shape energy policy in this country. Prerequisites: EVR 3010 or permission of the instructor.

**EVR 4352 U.S. Environmental Policy (3).** Introduction to U.S. environmental policy. Reviews primary U.S. environmental legislation and the role of regulation. Prerequisites: EVR 3011 or permission of the instructor.

**EVR 4401 Conservation Biology (3).** Applies modern theory from ecology and population genetics to conservation issues. Topics include population viability studies, reserve design, forms of rarity, and policy issues. Prerequisites: BSC 1010 and BSC 1011.

**EVR 4411 Human Organizations and Ecosystem Management (3).** Environmental aspects of organizational theory and strategic management in indigenous and other local communities, non-governmental organizations, governments, and the private sector are discussed. Prerequisite: An introductory Environmental Studies course.

**EVR 4415 Population and Environment Issues (3).** Examines the history, current status and projected growth of the human population in relation to environmental issues. Prerequisites: College algebra, STA 3111 (or equivalent), EVR 3011 or permission of the instructor. (F)

**EVR 4592 Soils and Ecosystems (3).** A review of basic soil science concepts; analyses of basic physical and chemical properties of soils, emphasizing soils in South Florida ecosystems. Prerequisites: BSC 1010 and CHM 1045, or permission of the instructor.

**EVR 4592L Soils and Ecosystems Lab (1).** Laboratory exercises provide soil characterization techniques used in soil science and complement the lectures by carrying out experiments illustrating soil science concepts, soil formation, soil properties, and soil nutrients cycling. Prerequisites: CHM 1046, BSC 1011, CHM 3120 and their corresponding labs. Corequisite: EVR 4592.

**EVR 4594 Analysis of South Florida Ecosystems (3).** In-depth study, using case study approach of the major ecosystems of South Florida, the environmental issues facing them, and the management strategies employed to sustain their natural resources. Prerequisites: BSC 1011, BSC 1011L, EVR 3011.

**EVR 4596L Applied Field Ecology (2).** Introduction to basic methodologies of applied field ecological research; builds ability to identify major plant and animal species and community assemblages in South Florida. Prerequisites: BSC 1011, BSC 1011L, EVR 3011.

**EVR 4869L Environmental Problem Solving Lab (2).** Provides first-hand experience in solving environmental problems (problem definition, study design, data collection, analysis & reporting). Includes use of case study, social survey, computer modeling and GIS techniques. Prerequisites: STA 3111, ECO 2023, EVR 3010, and EVR 3011, or permission of the instructor.

**EVR 4905 Research and Independent Study (Var).** Student develops and carries out research project with guidance from professor. Permission of the instructor.

**EVR 4920 Environmental Studies Seminar (1).** Series of talks by FIU and external experts addressing both development of professional skills and current environmental topics. Students prepare short presentations.

**EVR 4934 Special Topics (1-3).** Advanced undergraduate level course dealing with selected environmental topics. Course may be repeated with change in content.

**EVR 4XXX Introduction to GIS (3).** To study the functionalities of the popular desktop GIS programs Arc view, as well as the basic concepts of GIS and DRMS. The focus will be on data acquisition, analysis and synthesis using GIS approach. Prerequisite: Permission of the instructor.

**EVR 4XXXL Restoration Ecology Laboratory (1).** Field analysis of topics and concepts covered in Restoration Ecology. Prerequisites: EVR 3013 or PCB 3043 or permission of the instructor. Corequisite: EVR 4323.

**EVR 5061 South Florida Ecology: Field Studies (3).** Introduction to ecology of South Florida. Series of field trips to unique ecosystems (Everglades, hard-wood hammocks, coastal regions). No science background required. Intended for teachers. Not intended for Environmental Studies graduate students.

**EVR 5065 Ecology of Costa Rican Rainforest (3).** Intensive study of Central American tropical forest ecosystems conducted for two weeks in Costa Rica in sites ranging from lowland to high mountains. Primarily for teachers. Prerequisites: Graduate standing or permission of the instructor. (SS)

**EVR 5066 Ecology of the Amazon Flooded Forest (3).** Study of the ecology of the flooded forest with emphasis on the relationships between plants and animals and the annual flooding cycle. The course includes a two-week field study at river camp in Peru. Prerequisites: Graduate standing or permission of the instructor. (SS)

**EVR 5067 Tropical Forest Conservation and Utilization (3).** Distribution and classification of tropical forest ecosystems, their description and the ecological principles governing their function. Factors influencing tropical forest utilization and destruction, and strategies for sustainable use and conservation. Prerequisites: EVR 5355 or permission of the instructor.

**EVR 5236 Air Pollution Dynamics (3).** A course designed to give an understanding of the fates of atmospheric pollutants. Scavenging processes in the atmosphere; radiation, residence times, chemical reactions, global transport process, point source dispersion and modeling calculations. Prerequisites: EVS 3360 or EVR 4231.

**EVR 5300 Topics in Urban Ecology (3).** Topics include urban and suburban ecosystems emphasizing energy relations, ecological functions of urban landscapes, urban wildlife, urban forestry and ecological issues relevant to human health and well-being. Prerequisites: PCB 3043 or permission of the instructor.

**EVR 5313 Renewable Energy Sources (3).** An analysis of renewable energy sources and energy efficiency including wind, biomass, geothermal, hydroelectric, solid waste, solar heating, solar cooling, and solar electricity. Prerequisite: Permission of the instructor.

**EVR 5315 Energy Resources and Systems Analysis (3).** Detailed analysis of energy flows in natural and man-made systems. Energy systems analysis. Energy use patterns. Conventional and alternate sources of energy.

**EVR 5320 Environmental Resource Management (3).** The scientific and philosophical basis for the management of renewable and non-renewable energy, mineral, air, water, and biotic resources. Prerequisites: Graduate standing or permission of the instructor. (F)

**EVR 5330 Tropical Ecosystems Management (3).** Analyzes the dimensions of tropical ecosystems management. Organizational and institutional dynamics of the management of tropical forests, agriecosystems, and coastal areas are covered. Prerequisite: Permission of the instructor.

**EVR 5350 International Organizations & Environmental Politics (3).** The role of international organizations in environmental politics and the process of their formation and change in response to environmental problems. Prerequisites: Graduate standing or permission of the instructor.

**EVR 5353 International Energy Policy (3).** Focuses on the distribution of global energy resources and related issues. A comparison of the energy policies of various countries serves as the basis for exploring alternative energy policy approaches. Prerequisites: EVR 5355 or permission of the instructor.

**EVR 5355 Environmental Resource Policy (3).** A survey of international and national environmental policy and the legal, economic, and administrative dimensions of international accords and selected U.S. law. Prerequisites: EVR 5320 or permission of the instructor. (S)

**EVR 5360 Protected Area Management (3).** Interdisciplinary examination of ecological, administrative, and socio-economic aspects of managing protected natural areas. Case studies from developed and developing nations.

**EVR 5405 International Biological Conservation Accords (3).** Survey of international biological conservation agreements. Topics include bilateral migratory wildlife agreements, the Berne Convention on Migratory Wildlife, CITES, Ramsar, the UNCED Biodiversity Treaty and the Statement of Principles on Forests. Prerequisites: EVR 5355 or permission of the instructor.

**EVR 5406 U.S. Endangered Species Management (3).** History and implementation of the U.S. Endangered Species Act. Topics include legal and administrative aspects, reauthorization, procedures for recovery planning

and conflict resolution, and biological measures of success. Prerequisites: EVR 5355 or permission of the instructor.

**EVR 5410 The Human Population and Earth's Ecosystems (3).** Explores the impact of the human population of Earth's ecosystems. Reviews current population data at global, regional, and local scales. Includes study of specific South Florida carrying capacity issues.

**EVR 5907 Research and Independent Study (VAR).** The student works with a professor on a research project. Variable credit.

**EVR 5935 Special Topics (VAR).** A graduate-level course dealing with selected environmental topics. The content will not necessarily be the same each time the course is offered.

**EVR 5936 Topics in Environmental Studies (3).** An analysis of several current environmental topics. Recommended for primary and secondary school teachers.

**EVS 4XXX Agroecology (3).** Application of ecological principles to modern farming systems to achieve goals of long term food production without depleting Earth's resources. Prerequisites: EVR 3013 or equivalent or permission of the instructor.

**EVS 4XXX Sustainable Agriculture (3).** Analysis of sustainability of modern agricultural systems under a variety of ecological economic and cultural settings. Familiarizes students with socioeconomic, urban policy, sustainable agriculture. Prerequisites: EVR 3013 or equivalent or permission of the instructor.

**EVS 5145 Ecotoxicology (3).** Fate of chemicals and their acute and chronic toxicological effects on aquatic and wildlife systems. Dose-response relationships, bioavailability, bioconcentration, microbial degradation, and biomonitoring. Prerequisites: One year of biology and one year of chemistry and CHM 2200 and lab or permission of the instructor.

**EVS 5194 Applied Soil Biology (3).** Examines biology of soil organisms and biologically-mediated chemical transformations occurring in soil ecosystems. Prerequisite: BSC 1011.

**EVS 5637 Ecological Risk Assessment (3).** Evaluation of risks of foreign chemicals to aquatic and terrestrial systems. Concepts and methodology used in the hazard and risk assessment of toxic effluents, chemical/oil spills, and contaminated sediments. Prerequisites: One year of biology and one year of chemistry and CHM 2200 and lab or permission of the instructor.

**GIS 5050 Environmental GIS (3).** Concepts of GIS, database design and management, advanced spatial analysis and modeling, uncertainty, error, and sensitivity in GIS. Focus on GIS project design, execution and presentation using AroGIS. Prerequisite: Permission of the instructor.