

CAP's Final Recommendation on Environmental Studies Minor

TO: Steering Committee
FROM: Committee on Academic Programs
RE: Environmental Studies Minor
DATE: March 14th, 2014

Background:

On September 3rd 2014, Steering sent CAP a charge with an attached proposal written by Dean Jeffrey Osborn of the School of Science regarding a new minor in Environmental Studies.

Charge:

Steering asked CAP to “determine if all academic units that might be affected by creation of the minor have been consulted.” Steering also noted that CAP did not need to collect testimony on this charge.

Final Recommendation:

CAP discussed with Dean Osborn the protocol required to confirm that all Departments whose courses are included in the proposed minor had given their approval for this addition. Following this conversation, Dean Osborn prepared a document that outlined the Departments and individuals who were contacted as part of this process. Emails were attached that indicated approval of courses from the respective Departments whose courses are included in the proposed minor. After reviewing the documents and noting that two small changes were made to the proposed minor based on these emails, CAP confirms that all academic units impacted by the minor have been contacted and that this part of the minor approval process has been fulfilled.

Minor In Environmental Studies

Rationale:

In 1965, Middlebury College became the first in the United States to offer a program in Environmental Studies. Since this time, environmental studies, environmental sciences, and related programs have developed across the United States at all levels of higher education. Among colleges and universities in New Jersey, Kean, Stockton, Rider, Ramapo and Princeton all offer such academic programs; Rutgers' reorganization created an entire School of Environmental and Biological Sciences. The Association for Environmental Studies and Sciences was founded in 2008 as a professional venue for researchers working in this growing and vibrant multi-, inter-, and trans-disciplinary field. The Association for Environmental Studies and Sciences writes:

“Environmental scholars and scientists inevitably discover that the challenges we face transcend the disciplinary knowledge many of us practice. As E. O. Wilson observed, “The fragmentation of knowledge and resulting chaos are not reflections of the real world, but are artifacts of scholarship.” A major aim of AESS is to encourage interdisciplinary understanding of environmental science, policy, management, ethics, history, and all of the other vital contributions of traditional disciplines in order to better understand that real world and humans' relations with it. The Association was envisioned from the start as a community of environmental scholars and scientists, not a confederation of disciplines. Our ranks include microspecialists, synthesists and enviro-generalists. Fundamental to our embrace of higher education is the notion that broad advances in environmental knowledge that benefit both humans and the rest of nature require disciplinary, interdisciplinary, and transdisciplinary approaches to research and learning. Moreover, they require humility about what we know and don't know, both as individuals and as representatives of disciplines. For it is only through learning communities of the type proposed for AESS that we can achieve “whole system” environmental education and the creative synthesis of new knowledge that promotes a healthier Earth. Such a synthesis would truly mark the coming of age of ES&S as a professional society.” Source:

http://www.aess.info/content.aspx?page_id=22&club_id=939971&module_id=35440

Environmental Studies, in contrast to Environmental Science, emphasizes the interdisciplinary and multidisciplinary focus of this field of study. At many institutions, the natural science-based program of Environmental Science draws on fundamental scientific knowledge in mathematics, chemistry, physics, and biology to provide advanced scientific understanding of contemporary environmental challenges, such as, air and water pollution, or the potential for alternative energy supplies. In contrast, Environmental Studies provides a broadly integrated understanding to the social, political, historical, and scientific facets of our environmental challenges. Given the existing courses and limited resources for growth in additional courses at TCNJ, Environmental Studies is the more appropriate and relevant minor to pursue at this point. (Adapted from <http://envirosci.cals.wisc.edu/environmental-sciences-vs-studies/>)

Need/Demand for Program:

In 2004, TCNJ created an “interdisciplinary concentration” in its liberal learning curriculum in recognition of this important subject area and to allow interested students to pursue environmental studies at TCNJ, hereafter referred to the Environmental Studies Interdisciplinary Concentration or ESIC. According to the Registrar in Fall 2013, ESIC has grown to be the third most popular among 21 interdisciplinary concentration, with ESIC students drawn principally from the Schools of Business, Humanities & Social Science, and Science. One student has pursued a self-designed major in “Economics of Environmental Science” and another is pursuing a self-designed major in “Environmental Studies”. Despite great interest in this academic area, advising over the past few years has indicated that many (if not most) students decide that because of scheduling, they are unable or unwilling to complete the concentration. This translates into just 10 students enrolled in ESIC as of Fall 2013. This situation is not unique to ESIC. Only 72 of 6657 undergrads (1%) have a liberal learning concentration.

In contrast, 1027 of 6657 undergraduate students (15%) had declared minors. Minors have fewer classes (5 instead of 7) and as such may be more flexible for students and do not put additional pressure on students or faculty for capstone experiences. Minors are also widely recognized outside of academia, and are therefore more useful in establishing the credentials of TCNJ graduates. To this end, the faculty supporting ESIC has developed a minor that serves the curricular interests of the students, and builds on the existing intellectual community centered on ESIC.

The minor preserves the importance of studying the environment from multiple disciplinary perspectives, but narrows its focus of courses to those with content and learning goals explicitly centered on the human/environment relationship. The minor deliberately embraces multi-disciplinarity, and at the same time reinforces a growing community at TCNJ that seeks and values interdisciplinary inquiry. As such, the minor has incorporated an additional school (Engineering) and is being developed in conjunction with the minor in Sustainability Education (SE) in the School of Education and the Sustainability Year (a collaboration between the Sustainability Institute, formerly Sustainable Jersey, and the TCNJ Bonner Institute for Civic and Community Engagement).

Students completing the minor will gain sufficient knowledge to understand environmental issues in the context of human interaction with the natural world, as students will complete courses from the perspectives of relevant natural sciences, engineering, quantitative reasoning, social sciences, and arts and humanities. As such, the learning goals for the new minor include:

- (1) Students will demonstrate the ability to apply skills and knowledge from multiple disciplines to the analysis of environmental problems and possible solutions;
- (2) Students will demonstrate knowledge of major environmental issues and implications of those issues for humanity;

- (3) Students will demonstrate an understanding of the interactions between human activities and the ecology of natural systems, as well as trade-offs and constraints on environmental policies.

The new minor does not substantially break from the learning goals of ESIC and, in fact, reflects the purpose of the liberal learning interdisciplinary concentration in Environmental Studies, which was

“designed for students who are interested in learning more about the natural environment and the ecology of the planet as well as the relationship of political, social, cultural, and economic activities to the environment. Environmental issues are studied from the perspectives of relevant natural sciences, quantitative reasoning, the social sciences, and the arts and humanities. Students completing the concentration gain sufficient knowledge to understand environmental issues in the context of human interaction with the natural world. They also gain the motivation and the ability to apply pertinent skills and knowledge developed throughout their curriculum to the analysis of environmental problems and possible solutions. Students will gain an overview of the major environmental issues and the implications of those issues for humanity. They will understand the interactions between human activities and the ecology of natural systems as well as understand trade-offs and constraints on environmental policies.”

Source: <http://liberallearning.pages.tcnj.edu/courses-information/interdisciplinary-concentrations/environmental-studies/>

As an institution of higher learning that aspires to prepare our students to be well-informed and active good citizens, it is absolutely crucial that The College of New Jersey join the myriad of colleges and universities that have developed academic programs in Environmental Studies. The aim is to attract a broad range of students and help them forge connections between their major programs of study and interdisciplinary environmental studies. Not only does this contribute to the job prospects of our graduates, it ensures that we are doing all we can to produce a generation of community members who are able to contribute to solving some of the most complex and dire problems facing our world today.

Description:

The minor in environmental studies has as its central organizing principle that to understand the human/environment relationship, students must understand how to examine this relationship from multiple disciplinary perspectives, within and outside the natural sciences. To this end, students are required to take five courses, with at least two from different Natural Science & Engineering disciplines (biology, chemistry, engineering, geology, physics) and at least two from different Social Science & Humanities disciplines (anthropology, economics, history, journalism, literature, philosophy, political science, sociology, women's & gender studies), with no more than two courses from any single discipline. Students may elect to complete either a third course in Natural Sciences & Engineering or in Social Sciences & Humanities, or may complete Independent Study, Independent Research, or Internship in Environmental

Studies (ENV 391, ENV 393, or ENV 399). Certain FSPs may also count towards the minor, with the approval of the Environmental Studies committee

NEEDED RESOURCES:

Faculty and Support of Instruction:

Over the past year a sizeable group of interested faculty and administrators have indicated support and interest in environmental studies, particularly as an out-growth of the Environmental Studies Interdisciplinary Concentration, whose faculty sponsors are all involved with the current environmental studies minor proposal. These faculty, as well as others across campus, particularly from the Schools of Education and Engineering, are regularly teaching courses that already address key environmental issues within their respective disciplines. Because of the large amount of current interest, there are no significant additional faculty curricular demands created by the new minor.

Ideally, the faculty member who serves as the Environmental Studies minor coordinator will receive some sort of release from course teaching to provide coordination across multiple departments for scheduling, as well as advising current and prospective minors (and potentially self-designed majors). The administrative duties of such a coordinator do not merit a full course release each year; however, coordinating and advising difficulties in another new multidisciplinary minor (public health) indicate that some form of release is warranted. We estimate that the initial needs for the minor should be one course release over the first three years, although this should be revisited in the event of higher than expected enrollment.

Library Resources:

Since there is already a strong interest and existing courses in disciplinary environmental studies, expansion of bibliographic resources have already been ongoing and there are no additional resources necessary.

Equipment, Laboratory Support, Computer Support:

The minor in environmental studies requires no new equipment and depends completely on preexisting computer and laboratory support.

Facilities:

No new facilities are needed for the environmental studies minor.

Minor Requirements

Students will complete five courses with a minimum of four disciplines represented (no more than two classes may be completed from a single discipline); these five classes will include at least two and no more than three courses from selections in (1) natural sciences and engineering and (2) social sciences and humanities. At least three courses will be at the 300 or 400 level. Students may elect to complete one course unit of independent study, independent research, or internship in environmental studies (ENV 391, 393, and 399) in lieu of a third class in either natural sciences & engineering or social sciences & humanities.

“Topics” courses in any discipline and some FSPs may count towards the minor with the approval of the Environmental Studies Minor Committee.

Students who complete ENV 391, 393, or 399 as their fifth course must follow TCNJ and relevant departmental policies regarding independent study, independent research, and/or internship experiences. If the faculty advisor for ENV 391, 393, or 399 is not a member of the current Environmental Studies Minor Committee, the final written component for the experience must be evaluated by a member of the committee in the same or closely-related discipline prior to the assignment of a final grade.

In addition, students are required to complete a one unit co-requisite to demonstrate quantitative competency.

<p>Natural Sciences and Engineering: Students must select at least two and no more than three courses with at least two disciplines represented.</p>

BIO 172/Topics in Biology (for Liberal Learning): The Biology of Alien Invasions*

1 course unit
(occasionally)

Our planet and society are faced with profound challenges resulting from human activity on a global scale. One of the most important challenges is the introduction by people of alien (non-native) species into new territories that are oceans and continents away from where they evolved and have always lived. Some of these species become invasive in their new territories, causing major disruptions in the invaded ecosystems. In this course, students will explore the power of biological science for understanding environmental problems, through the lens of invasive species. There has been a groundswell of scientific effort over the past 20 years to understand the intricate processes and effects of ecological invasion in an increasingly globalized world. Given the many services that well-functioning natural ecosystems provide for human society, and our obligation to preserve the diversity of life on Earth, these efforts are of critical importance to a sustainable future.

*Field trips may be required at the student's expense.

BIO 173/Humanity and the Natural World

1 course unit

(with laboratory)

(fall, summer, annually)

Humankind's place in, and influence upon, the natural world are addressed. Evolution and genetics are studied in the context of populations, communities and ecosystems. The implications of our environmental impact are explored; and thus the need for planning for sustainability

BIO 221/Ecology and Field Biology*

1 course unit

(with laboratory)

(fall, spring, annually)

Prerequisite: BIO 185 (grade of C- or higher)

An introduction to modern ecology. The interactions that determine the distribution, abundance, and function of organisms, populations, and species are examined both theoretically and practically within an evolutionary context. Topics covered include physiological ecology, optimization theory, natural selection, population biology, species interactions, community relationships, and ecosystem dynamics. Laboratory and field activities emphasize quantitative and experimental approaches to the study of ecology.

*Field trips may be required at the student's expense.

BIO 315/Plants and People*

1 course unit

(with laboratory)

(occasionally)

Prerequisite: BIO 185 (grade of C- or higher)

Integrates the fundamentals of plant growth, reproduction, metabolism, and disease with the utilization of plants by people by focusing on agriculture, medicinal plants, and plant conservation biology. Addresses history and methods of agriculture with attention to modern plant breeding, genetic engineering, and comparison of chemically intensive and organic crop-growing techniques. Also considered are the central role of plant secondary metabolites in traditional healing and modern drug development. Explores different approaches to the conservation of useful plant biodiversity. Laboratory component includes experimental group projects in the laboratory and greenhouse, preparation of an herbarium collection of useful plant specimens collected and identified from the field, and selected trips to see plant sciences in action.

**Field trips may be required at the student's expense.

BIO 360/Oceanography*

1 course unit

(with laboratory)

(spring, even-numbered years)

Prerequisites: BIO 185 (grade of C- or higher); CHE 202

Introduction to physical, chemical, geological, and biological oceanography. Lecture and discussion topics include plate tectonics, bathymetry, physical and chemical properties of seawater, currents, waves, tides, open ocean and benthic ecosystems, estuarine, intertidal and coral reef ecology, and marine mammals. The laboratory will focus on biological oceanography and will include two one-day weekend field trips.

*Field trips may be required at the student's expense.

BIO 365, 366/Natural History of the Galapagos Islands and Ecuador I, II

1 course unit (with field laboratory component)

(spring/Maymester, odd-numbered years)

(same as HON 365, 366)

Prerequisite: BIO 185 (grade of C-or higher)

Restriction:

Open only to students who have been accepted into the TCNJ faculty-led abroad program—a two-week, intensive trip to the Galapagos Islands and Ecuador. An immersion experience to develop a deep understanding of the natural history (including ecology of plants and animals, geology, and climate) of the Galapagos Islands and Ecuador, with a reflection on interactions between these and the history, culture and economics of the Islands and Ecuador from pre-colonial to modern times.

*Participation in the faculty-led program is required and is at the student's expense.

BIO 470/Topics in Biology: Conservation Genetics

Pre/corequisite: BIO 185 211, 221, and 231

(with recitation; possible lab under development)

(spring, alternate years)

Founded in evolutionary ecology and genetics, this course focuses mostly on the genetic management of small populations. Endangered species, captive breeding programs, and populations in highly impacted landscapes all fall under this category. Furthermore, for national and state parks (etc) and conservation scientists, there is a desire to establish taxonomic certainty for endangered species and to divide populations into management units based on evolutionary genetic differences. Finally, genetic markers can be used in a forensic application to identify and track endangered species (or tissues from those organisms) that are being sold on world markets.

CHE 370/Selected Topics in Chemistry: Environmental Chemistry

This course provides background in the science, history, and social impact of environmental chemistry. Topics include: sustainability and green chemistry, hazardous wastes and their management, toxicity of substances, pesticides, water and air quality, climate change, fossil fuels and renewable energy. *Prerequisites: MAT 096 and CHE 202.*

CIV 381/Environmental Engineering

1 course unit

(fall semester)

Prerequisites: CHE 201

General principles associated with environmental engineering are discussed including: water, soils, and air pollution analyses. Topics discussed include: introductory water and air quality constituents, hazardous waste, wastewater, air pollution, noise pollution, nuclear waste, commercial and residential environmental concerns, environmental law, solid waste and alternative energy sources.

PHY 120/Introduction to Geology

1 course unit

(with laboratory)

(every semester)

Geological concepts, principles, and processes as they relate to the relationship between people and their environment are emphasized. Topics include: minerals and rocks, components of the hydrologic cycle, dynamic earth processes, and regional studies

PHY 171/Introduction to Meteorology

1 course unit

(with laboratory)

(spring, every year)

Basic weather processes and forecasting are emphasized. Topics include: the Earth-Sun System, heat balance, moisture and precipitation, air masses and fronts, storm systems, ocean circulation, climate, atmospheric optics, air pollution and satellite imagery.

PHY 220/Advanced Geology

1 course unit

(with laboratory)

(spring, odd-numbered years)

Prerequisites: PHY 120 (recommended) or PHY 201 or permission of instructor

The goal of this course is to present a modern, inquiry-based introduction to plate tectonics, earthquakes, and volcanoes. Topics include seismic wave interpretation, fault mechanics, earthquake prediction, volcanic hazards, volcanism and climate change, and more. This course is writing intensive and students will write two formal laboratory reports and a term paper from a topic of their choosing related to the course material

PHY 345/Physics of Clouds and Climate

1 course unit

(spring, even-numbered years)

Prerequisite: PHY 202 or PHY 201 and MAT 128

This is a course focused on the study of the physical components and processes of Earth's atmosphere, with special focus on the intertwined physics of clouds and climate change. The course takes an interactive approach to understanding clouds and radiation in the atmosphere, including collaborative problem solving, topical literature review and writing, tutorials on state-of-the art weather forecasting software, 3D visualizations, and several field exercises. The course satisfies the mid-level writing assignment.

Social Sciences and Humanities: Students must select at least two and no more than three courses with at least two disciplines represented.

ANT 341/ Environmental Anthropology

1 course unit

(occasionally)

This course reviews classic perspectives in cultural ecology, but focuses on the more recent scholarship, especially scholarship that addresses human ecology, political ecology and urban ethnography to give the student perspective on how the environment is experienced in multiple cultural contexts, and how the environment affects different cultures in various ways.

ECO 350/Economics of Environmental Quality

1 course unit

(fall)

Prerequisite: ECO 101

An examination of production and consumption from the perspectives of ecology and applied economic theory. Resource utilization, externalities, pollution-control methods and their theoretical and practical consequences for the U.S.; developed and less-developed economies will be analyzed in terms of the economic goals of efficiency, equity, and growth. A research component is required.

HIS 388: Environmental History

This course offers the thematic assessment of human interaction with nature over time. Comparative case studies will examine differing land-use practices and the intensifying environmental pressures of the 20th century.

JPW 335: Health and Environmental Journalism

Students will learn to report and present news related to health and environmental issues using both primary and secondary methods. This will include researching information in scientific journals, scraping public databases and collaborating on the creation of multimedia and/or interactive stories, graphics and public information systems. Students will also learn to interpret and responsibly communicate information about health-risks from environmental contamination. Significant attention will be given to related social justice issues, including health disparities and environmental justice considerations. As this a community-engaged learning course, students will collaborate with community-based organizations on reporting projects that address community information needs.

LIT 381: Literary History of Nature

This course takes an ecocritical approach to literary history by examining varying literary constructions of the relationship between humans and their natural environment. By providing insight into historical development of modern ideas about nature and the earth, the course equips students to think ecocritically about literary and non-literary texts in the contemporary world.

PHL 265/Environmental Ethics

1 course unit
(same as HON 265)
(spring)

Prerequisite: One course in philosophy or permission of instructor

A course providing a comprehensive overview of the key issues and arguments within the field of environmental ethics. The course includes an examination of some basic issues in metaethics and normative ethical theory, and several kinds of ethical arguments for animal rights and environmental protection. We will also study major environmental movements, such as deep ecology, social ecology, ecofeminism and the environmental justice movement, and will consider selected public policy issues such as habitat preservation, land-use management, or pollution abatement.

POL 355/ Political Economy of Natural Resources

1 course unit
(alternate years)
(same as INT 355)

This course is designed to give advanced undergraduates an introduction to scholarship on the politics of natural resources use. It combines theoretical material with study of a wide range of detailed cases --cases that vary by the type of natural resource (minerals, water, forests), by the geographical (and to some degree, historical) setting, and by the level of analysis (local, national, and international). Though the course is focused on political questions, it draws on scholarship from economics, history, and geography.

POL 370: Topics: Global Environmental Politics (This was taught as a topics course by Michael Nordquist in Spring 2013, and he indicates that Political Science will likely go through normalization in the political science curriculum in the near future.)

SOC 345/ Inequality, Pollution and the Environment

1 course unit

(occasionally)

Environmental sociology applies the sociological imagination to human interactions with the non-human environment. Topics addressed include: social/environmental theory, the social origins of environmental problems (such as ozone depletion, deforestation, and water pollution), environmental inequality, environmental racism/environmental justice, and the social history of land use, both in New Jersey and around the world

WGS 374/EcoFeminism

1 course unit

(annually)

Building on the core precept that the domination of women and the domination of nature are fundamentally connected, ecofeminism offers a distinctive, interdisciplinary lens on the world, drawing on not only feminism and ecology, but also historical analysis, philosophy of science, cultural study, the arts, community development, spirituality, and a commitment to challenging oppression in all its forms. Through readings in the various disciplinary threads that inform ecofeminism, we will explore ways in which systemic social inequalities shape human relationships to the natural environments; challenge common abuses of the environment and offer alternatives; and study current movements globally.

Co-requisite in Quantitative Competency: (1 unit)

Students must complete at least one of the following:

Biometry (BIO 352) [prereq. BIO 185]

Applied Economics and Business Statistics (ECO 231) [prereq. STA 215 or equivalent]

Design and Statistical Analysis (PSY 203) [Psychology majors only; prereq. PSY 121]

Quantitative Research Methods (SOC 302) [prereq. SOC 101 and STA 115]

Inferential Statistics (STA 215) [prereq. MAT 125 or MAT 127]