

CURRICULAR PROPOSAL FOR ENVIRONMENTAL SCIENCE MAJOR BIOLOGY DEPARTMENT

Rationale for the Environmental Science Major

Recruitment of new students to JCU

Presently, both the Biology Department and Chemistry Department at JCU train many students interested in pursuing health-related professions. These students frequently major in Biology or Chemistry-Life Sciences. We clearly wish to continue to attract students to these majors, providing critical pre-professional training for health-related careers. We have a concentration in Environmental Studies, but enrollment in this program has been small. We feel that a new major in Environmental Science will increase the program's visibility and serve to attract a new group of students to the university. The program is meant to draw students who have identified interest in ecology and environmental science careers while still in high school. The intent of this major is at least in part to attract more students to John Carroll University and thus is consistent with current efforts to increase enrollment. Additionally, this program may serve students that realize in their sophomore year that they do not want to pursue a career in health science, but would like to continue in biology. The major is designed so that students in their second semester of the sophomore year can declare biology or environmental science as their major with no penalty, i.e. the first two years of coursework apply to both majors.

Environmental Science in the context of University Mission

We consider this program to build on John Carroll's commitment to improving the world and training students to value service. The program will train students to be advocates for environmental issues and enter values-based careers, working towards improving environmental conditions world-wide and respecting life through biodiversity preservation. We envision that in the next decade environmental issues (e.g., global climate change, habitat destruction, invasive species, nitrogen deposition, among others) will become more pressing and garner more attention in the public and private sphere. Thus, through this proposed major we will address the growing need for environmental scientists.

Environmental service will be expected as part of this program. Working with the Center for Service and Social Action, we will develop meaningful service opportunities in the areas of species conservation, natural areas preservation, invasive species monitoring and removal, recycling, and other related areas. Students will be encouraged to build service portfolios as part of their professional development.

Assessment Plan

To assess the success of the program we will track the number of students entering into and graduating from the program. Additionally, we will track where students intern, as well as obtain positions as graduate students or career professionals. Additionally, prior to graduation, all students in the program will be required to take a comprehensive exam over the material covered in the required courses. This exam will replace the MFAT

exam used for the Biology major, as no comparable exam exists in Environmental Science of which we are aware.

History of the Proposal

Initially, Biology faculty interested in the major collected information on requirements for Environmental Science degrees at institutions similar to John Carroll. This ad hoc group of Biology faculty discussed the merits of the various programs and outlined a proposed set of courses. This proposal then was brought before and discussed among the entire Biology faculty. Further program modifications were made to reflect the views expressed by the department as a whole. At the end of this process, the Biology faculty agreed they were satisfied with the requirements (Table 1).

After this curricular plan was approved by the Biology faculty, Dr. Jeff Johansen met with Dr. Dave Mascotti (Chair of the Chemistry Department) and Dr. Anthony Roy Day (Chair of the Physics Department). These two departments would be affected most by the program, as the proposed required courses General Chemistry and Earth Sciences are housed in these departments. Both department chairs were positive about the proposal and subsequently discussed it with members of their respective departments. The Physics Department was particularly interested in the Earth Sciences component of the major, as they are interested in expanding their expertise and offerings in Earth Science and Geology. Dr. Jeff Johansen and Dr. Rebecca Drenovsky also met with Dr. Wendy Wiedenhoft, the coordinator of the Environmental Studies concentration. Dr. Wiedenhoft was very enthusiastic about the new major and commented on its rigor and potential to attract students. She felt that the impact on the concentration would be minimal. Additionally, we discussed potential courses in Political Science and Sociology to include in our requirements, and we incorporated her suggestions. Dr. Jeff Johansen also discussed the program with Dr. Dean Birch, who developed the Environmental Studies Concentration and served as its coordinator, prior to Dr. Wiedenhoft. Dr. Birch was supportive of the program as written. He also suggested that an Environmental Studies major, focusing on policy-related issues, should be developed. However, these programs would need to be housed within a department other than Biology, given the nature of the coursework.

Environmental Science in the context of other opportunities available through collaborations between the Biology Department and other organizations

We are interested in increasing study abroad opportunities for our students. Recently, representatives from our department visited study abroad programs in Costa Rica and the United Kingdom. As a result of the trip to Costa Rica, a new field course is being offered during Fall 2007 (BL 206, Tropical Biology). Additionally, the strong Environmental Science and Marine Science program at University of Hull – Scarborough Campus would complement courses we could offer. John Carroll also has a current relationship with Denmark's International Study Program (University of Copenhagen), and courses in Environmental Science and Marine Biology offered there could complement our Environmental Science program, as well. We also have taken students on extended field trips to Alaska and Belize, and potential exists within the department to expand the offerings to the western Deserts (i.e., Great Basin, Mojave, Sonoran, and Chihuahuan) and California. All of these study programs could enhance the Environmental Science

curriculum. Overall, these opportunities will be part of our marketing strategy for the new major.

Currently, we are partners with Cleveland State University and the Cuyahoga Valley National Park in managing the Woodlake Environmental Field Station. Some of the courses to be developed or modified for the new major likely will make use of this field station, and it will be part of the marketing for the major.

Implementation of the Environmental Science major and resource allocation

We intend to implement this new major with no new additional resource requirements. Required courses for the major are already offered by the university. Some of these required courses have replaced existing courses by increasing their environmental focus (e.g., Limnology will now be taught as Aquatic Resources). Other required and supplemental courses have been developed recently (e.g., Global Climate Change and Plant Ecology), due in part to curricular needs and a new hire in the department. We hope to attract part-time faculty to teach the GIS course (although this is also offered at University of Hull), most likely from park staff knowledgeable in the field. If we gain a large number of majors, we likely will develop a field botany course, which Dr. Drenovsky could teach. At present we do not anticipate hiring new faculty to cover this major. If the program is very successful in recruitment of students (such that the seat counts in biology go up appreciably), then we may in the future request a new faculty line and/or additional resources. However, the new line and resources is not a prerequisite to the establishment of a viable program in the immediate future. With respect to library resources, we may require ordering books related to GIS technology, as the course currently is not offered within the department. However, we foresee that these additional texts could be purchased with department's current budget.

Projection of anticipated enrollments

Our intention with the development of this new major is to maintain the quality and integrity of the Biology Department's successful pre-med program while diversifying the offerings available. Thus, our primary goal is to attract students with a different primary interest in biology compared to our current, typical Biology major. We project that eventually 20-30 students will enroll in this program. Most of the impact, in terms of student numbers, will be felt by the Biology Department. However, enrollment in courses such as General Chemistry, Earth Science, Environmental Politics and Policy, Environmental Law, Environmental Sociology, and Environmental Movements and Society also would be affected.

Table 1. Proposed Curriculum for Environmental Science Major

<i>Required Courses</i>	<i>Credits</i>
BL 155, 157 Principles I	4
BL 156, 158 Principles II	4
BL 159, 160 Principles III	4
BL 222 Principles of Ecology	3
BL 224/224L Terrestrial Ecology	3
BL 331 Global Climate Change	3
BL 424 Aquatic Resources (replaces Limnology)	4
BL 444 Advanced Ecology	4
CH 141, 143 General Chemistry I	5
CH 142, 144 General Chemistry II	5
MT 135 Calculus	4
MT 228 Biostatistics	3
PH 101, 101L Earth Science 1	4
PH 102, 102L Earth Science 2	4
Select one course from the following:	3
PO 361 Environmental Politics and Policy	
PO 363 Environmental Law	
SC 290 Environmental Sociology	
SC 380 Environmental Movements and Society	
Total	61

<i>Additional Courses (6 credits more)</i>	
BL 206/206L Tropical Biology	4
BL 255 Field Botany (to be developed as need grows)	2-3
BL 275 GIS (taught by a part-time instructor)	3
BL 399 Guided Research	3
BL 425/425L Ichthyology	4
BL 435 Plant Ecology	3
BL 421/421L Herpetology	4
BL 440/440L Entomology (taught by a part-time instructor)	4
BL 442/442L Ornithology	4
BL 447/447L Algae as Bioindicators (to replace Phycology)	4

<i>Recommended Courses</i>	
CH 222-225 Organic Chemistry	8

Total credit hours for major is 67 credits

For comparison purposes: Biology Major

34 hours BL, 18 hours CH, 7 hours MT

Total is 59 credits (67 with Physics)

Total required for non-science core is 47 credits

Total remaining for sciences and other topics is 81 credits

