To: Dean Scott Furlong

From: Steve Dutch, chair of the Academic Affairs Council

Date: May 24, 2011

Subject: Academic Affairs Council Review of the Environmental Science Program

Overview

The Environmental Science Program is the centerpiece of UW-Green Bay’s interdisciplinary offerings in the natural sciences. It interfaces with and complements the Human Biology Program, which focuses on courses related to the biology of human beings. Natural and Applied Sciences, which houses most of the faculty within the Environmental Sciences Program, is also the budgetary home of disciplinary programs in Biology (co-taught with Human Biology faculty), Chemistry, Engineering, Geoscience (formerly Earth Science), Mathematics and Physics (minor only). Faculty teach courses both in their own disciplines as well as in the Environmental Sciences Program.

Relationships between the Environmental Science program and the disciplinary programs within NAS, as well as with Human Biology, are simple in concept, in that all the programs recognize a need for mutual support and work to achieve it, generally harmoniously. The actual realization of those ambitions can become very complex, because it is often necessary to reassign a faculty member from a disciplinary course to an interdisciplinary one, and some reassignments involve chain reactions where a faculty member may be reassigned to a particular course, and another reassigned to the newly vacated course.

Curriculum

The most significant modification of the Environmental Science curriculum has been the merger of the Physical Resources and Biological Resources tracks into a single track. The split into the two tracks looked reasonable in theory, but failed to fulfill expectations in practice. There was always an identity problem of distinguishing the Biological Resources track from the Biology Program. Likewise there was a problem distinguishing the Physical Resources track sharply from the Earth Science (now Geoscience) program, and the track did not attract a large number of students. The change resulted in little effect on faculty teaching loads. A few courses were eliminated and remaining courses are offered more predictably. The merger of the two tracks gives students a more integrated look at both the biotic and abiotic components of the environment. After additional experience with the reunified program, it may be possible to identify areas of emphasis for different interests.

It is an unfortunate fact that physics, chemistry and mathematics faculty have little opportunity to contribute to teaching courses with the Environmental Science prefix because of their teaching loads in their disciplines. Biology, Engineering and Geoscience faculty teach a large fraction of those courses. This does not reflect on any of the faculty or the disciplines but is
simply a structural fact of life arising from the availability of resources, enrollment demands
and the curricular needs of the disciplines.

Recently, a combined BS-MS Environmental Science program has been inaugurated. Under this
plan, students would receive graduate credit for some upper level courses and ideally complete
their studies in five years (although thesis completion may vary). So far there is little feedback
available to assess success, although the plan seems attractive. There seems to be no
information on the program on the University Web site, a problem requiring immediate
rectification.

Assessment

The Environmental Science Program has six learning outcomes and convened a panel of
instructors from the core upper level courses to assess how the courses meshed with the
learning objectives and discuss perceptions of student performance. There has been little
progress in developing more formal assessment methods that yield numerical results.

The job market for Environmental Science graduates seems to be good, but employability is
enhanced if students are willing to relocate.

One statistic that was rather startling was that, on the graduating senior survey, zero students
thought critical analysis skills and understanding biology and the physical sciences were
important to their current job or graduate program. The chair was unable to explain this
statistic, but the author of this review offers some observations. Student attitudes toward
learning wax and wane periodically, but the last few years have brought an upsurge of an
attitude that can only be described as anti-intellectual. There has always been sentiment
among many students that the emphasis of college should be preparation for the job market,
but it has become more common to see resentment at any course content not narrowly
focused on the final exam and immediate applicability. The tragic irony is that there has never
been a worse time in history for students to enter the job market with such an attitude. When
routine tasks can be farmed out to someone on the other side of the world more cheaply than
they can be performed locally, a narrow focus on “just what I need to know” is virtually a
guarantee of instant obsolescence.

Resources

Environmental Sciences and the disciplinary programs that support it are “one deep” in almost
all areas. Most lower level classes can be covered by replacement faculty but upper level
classes are difficult to cover and frequently must be cancelled if faculty are ill, on sabbatical, or
have a reassignment. Not only are many courses taught by just one faculty member, but
qualified ad-hoc replacements are impossible to find, and even in cases where several faculty
can cover a given course, the enrollment demands of lower level courses may prevent it.

One significant advantage that Environmental Sciences has is that faculty are active grant
gatherers. The availability of 150 funds to supplement normal 102 funds enables the program
to provide travel funds to faculty to attend meetings as well as augmenting S & E funds.
Conclusion

Environmental Science continues to be a pivotal part of UW-Green Bay’s interdisciplinarity, and despite an exceedingly complex web of demands to support its own courses as well as its associated disciplines, plus support courses in Human Biology, manages to balance those requirements. Although it contains a large number of faculty from a wide variety of disciplines, it achieves a high degree of collegiality. Greg Davis, the chair, not only oversees this complex operation but conducts almost all the advising for the program. It has long been the experience in Environmental Science that students who are advised by faculty experience far fewer problems in meeting their degree requirements.

The program continues to be stressed by lack of faculty resources, which limits the ability to offer courses frequently enough, or in enough variety, to satisfy student needs. Indeed, scheduling problems rank high on the list of complaints of graduating seniors. The program has engaged in assessment activities but, like most units, is still struggling to devise adequate assessment vehicles.
Course and Curriculum Questions Posed by the AAC:

1. Do travel courses and independent study courses satisfy elective courses?

Yes they do.

2. You indicated that you combined your two areas of emphasis, Ecology and Biological resources and Physical systems into one track. How does this affect faculty load and resources? What is the effect on students?

Faculty load has not changed a great deal in the sense that there is always more to teach than we can staff with the faculty at hand. Several courses have been eliminated and / or had their periodicity reduced; but at the same time other courses have increased enrollments.

The biggest effects on students are that courses are not cancelled as often as before the merger and all Environmental Science students are getting a more balanced – biotic and abiotic – look at the environment.

3. What is the relationship between the ES major and the physics minor and pre-engineering program? What kind of support is offered to the physics minor and pre-engineer program? How does this affect faculty load and resources?

Currently staffing the physics minor requires as many or more credit hour than the physic faculty can provide – often overloads are still required to staff the courses. Because of this, physics faculty do not have opportunities to teach Env Sci – prefix courses except on rare occasions (however, the same can be said for many of the chemistry and mathematics faculty members).

The curriculum in the pre-engineering program (that is taught by our engineers) is minimal – three classes total, split over two faculty members. The majority of engineering faculty contributions is in the Environmental Science program and in the ES&P graduate program.

4. What effect has the new BS/MS program had of numbers of students in major?

Not clear at this point – it does seem to be an attraction during campus previews, but I am not sure how many students have either taken advantage or have had the opportunity to take advantage of the program.

5. How has the ES curriculum been reformulated into a one-track program? Do you have plans for areas of emphasis in the future?

There is ongoing discussion with regard to emphases in the major. There is some indication that several sets of elective courses will be created and completion of courses within these sets will constitute an emphasis.

Emphases will be used mostly as marketing and advising tools if this happens to come about.

6. On the graduating senior survey the majority of students thought the frequency of courses offered was insufficient. Do you have enough faculty to increase offerings?
Not if we continue in our current mode. A curriculum committee is currently exploring means to increase the periodicity of core courses as well as being able to work within the parameters of the current faculty size. This will likely be accomplished by a combination of increasing enrollment caps in some courses, merging/redesigning some courses, and eliminating others. We realize that we are playing a zero sum game at best! Plans were much easier when we were expecting to grow.

**Assessment / Teaching Questions:**

1. What work has been done on developing a refined assessment plan that produces formal numerical data?

   Very little to this point

2. Would it be possible to use the single set of learning outcomes as assessment criteria?

   Yes, in fact the six learning outcomes were used for a round of assessment involving the course courses Env Sci 302, 303, 305, 407, 454, and 467.

Instructors from the 07-08 academic year of the Environmental Science major’s core courses met 12 September to discuss courses outcomes – perceptions of student learning and alignment of outcomes. The courses included were: Env Sci 302 Principles of Ecology; Env Sci 303 Conservation of Natural Resources; Env Sci 305 Environmental Systems; Env Sci 407 Mathematical Modeling of Environmental Systems; Env Sci 454 Remote Sensing and GIS; Env Sci 467 Ecological / Environmental Methods and Analysis.

In all classes, instructors felt that by the time the class was completed the students had done very well as a whole. A few deficiencies of students at the beginning of the courses were noted: Env Sci 302 experimental design; Env Sci 305 chemistry skills, Excel skills; Env Sci 407 knowledge of examples of environmental systems; Env Sci 454 data base skills.

Instructors aligned their courses with the six outcomes as noted in the table below. 1 represents the course minimally addressing the given outcome, 5 represents the course addressing the outcome in a highly substantial way. If the number is bold, then embedded assessment had been used.

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<tr>
<th>Outcome 1</th>
<th>Env Sci 302</th>
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<th>Env Sci 305</th>
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It was suggested that a meeting with individuals in the Assessment Office could help design a new graduating student survey.

3. What methods do you use to evaluate teaching?

   Currently CCQ's are the primary evaluation method for teaching.
Development Questions:

1. Is there enough S&E to support professional development of faculty?
   
   Not as much as would be liked – fortunately, NAS faculty members are tremendous grant writers and recipients. Because of grant success, NAS is fortunate to have 150 (overhead) funds that can be used to supplement the 102 (S&E) funds to support faculty development.

2. Will you have enough faculty to offer the 4 courses listed on page five every semester?
   
   Only if we reduce the number of faculty hours in the remaining courses in our curriculum – again this is a problem that the NAS Curriculum Committee is currently working on.

3. What are your plans to reduce reliance on ad hocs at the lower level?
   
   All of the disciplines within NAS have met to determine where efficiencies may be able to be made. This information has been brought to the curriculum committee for consideration.

4. Do you have enough faculty and resources to enhance NPS2 general education offering?
   
   Only be limiting other activities. However, if the currently proposed changes to the General Education Program are enacted, then NAS's required contribution to General Education will be reduced significantly.

Advising Questions:

1. On the graduating senior survey only 23% of graduates thought general education was valuable. Is there a way through advising to increase student satisfaction with general education?

   I believe that more students will be satisfied with general education (outside of the sciences) if they see that the science faculty are strong proponents of the non-science components of general education.

2. How much continuity is there in advising from freshman (or entry point) to graduation? Is there a process for assigning advising responsibilities?

   I see many of the students on a semi-regular basis. For the last decade I have taken care of the bulk of the advising within the program. This is a model that Environmental Science has used for many years. Prior to my role as the primary advisor Mike Morgan had done the same for as long as memory serves.

Other Questions:

1. Why is this program review being done when the last one was in 2008?

   You would need to ask Tim Sewall this question – I suspect that we got off schedule last time round because we were redesigning the program and submitted late.

2. What is the job market for ES graduates? Does the degree give students a competitive edge over graduates from another school?
It seems that the job market is fine provided students are willing to relocate. They are not guaranteed employment in the local region. I don't know how competitive our students are in comparison to students from other schools – on the other hand, I haven't had graduates coming back to complain that they were not employable.

3. On the graduating senior survey, can you explain why 0 students thought critical analysis skills and understanding biology and the physical sciences are important to current job or graduate program?

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Please fill in the following chart as a way to communication to the AAC what the actual FTE is and how it is used
<table>
<thead>
<tr>
<th>Faculty listed on UWGB Environmental Science website</th>
<th>Faculty appointment status</th>
<th>Number of General Education courses taught per year</th>
<th>Approximate number of Independent Studies/Internships per year faculty take on</th>
<th># of courses in their load that are specifically for the ES program per year (for ES Major/minor)</th>
<th>Advising responsibilities for ES students (Approx # of ES advisees)</th>
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