

TO: Department of Natural Sciences
FROM: Academic Program Review Council
DATE: February 2013
RE: Review of the Programs within the Department of Natural Sciences, submitted to Academic Program Review Council, May 24, 2012

Cc: Members of APRC 2012-13: Laura Jacobs, Chair; Jayson Iwen; Xingbo Li; Shevaun Stocker; Steve Rosenberg. Members of PBC: Jerry Hembd, Chair; Tim Cleary; Debra Nordgren; Mary Balcer.

Below is the report of the Academic Program Review Council regarding the self-study prepared by the programs housed within the Department of Natural Sciences. Natural Sciences has submitted their review in a transitional year for the Program Review Template. As indicated in the Timeline and Summary of Process in the current Guidelines, APRC also sends a copy of our report to the Planning & Budgetary Council for additional comments. The Department and Programs should write a response to APRC's report, or supply further detail if requested and necessary. The Department Response should be returned to APRC no later than April 15, at which time the APRC will compile all documents for submission to the Faculty Senate and to the Continuous Improvement & Planning Team (CIPT) for use in integrated planning.

APRC Response to the Program Review of the Department of Natural Sciences as submitted May 24, 2012.

The APR Council commends the efforts of the Natural Sciences Department, in their endeavors to complete and submit the Program Review. The Council recognizes the enormity of the task and complexities of the process.

Our response to your submission acknowledges strengths in clarity and thoroughness in describing both Department-level and Program-level practices and results for many of the Review prompts. We also identify responses that lacked clarity or depth in explanation for readers who may not be within the Department. This Response is meant for your consideration and to guide you in providing the clearest presentation of your Department and its Programs and practices for most effective understanding by all readers for future Program Review cycles/documents.

As an Executive Summary, the Council presents three main considerations:

1. APRC was challenged to understand portions of the document. The practice of cutting/pasting old information to create a current document resulted in a final document that jumped around in time and caused confusion for the readers (for example, under appendix A, curriculum, Mary Balcer is listed as dept chair, rather than program chair; and only 2 faculty are listed in Chemistry). The APRC recognizes that the structure and personnel of the department have shifted in the last few years and encourage continued efforts to develop a more cohesive departmental process for these types of tasks. We imagine that continued efforts along this line will lead to a more cohesive academic program review in the future.

2. The Natural Sciences Department has experienced, or is planning, several significant changes in curriculum (specifically, the addition of the Forensic Chemistry concentration and the major in Earth Science, for example). References were made to these changes in several places. Unfortunately, there was a lack of data justifying the offering of new curriculum. The APRC and, by extension, the CIPT are in a better position to advocate and support such endeavors when it is made more clear what the need and impact of these changes would be. It would also be informative to have data analysis of the effect on the Chemistry program since the adoption of the new concentration.
3. A particular concern that was raised in the document was the issue of faculty and staff load. The APRC is in a position (along with CIPT and PBC) to potentially advocate for and with programs and departments for meeting the needs that are presented in the program review document. Unfortunately, we feel unable to make specific recommendations to CIPT and PBC, at this time, around additional support of faculty and staff for the Natural Sciences Department because of the lack of clarity, specificity, and data on this issue. When mentioned, the data on current faculty/staff 'effort' was not explained adequately or was not directly connected to division of time to various roles. The discussion of academic staff load was particularly confusing for an outside organization to make sense of. The APRC acknowledges the concerns around faculty and staff load but does not feel, based on the review document presented, fully armed with the information that would be necessary for us to make specific recommendations to PBC and CIPT for the department.

Overall, the Council appreciates your Department's work in composing the Program Review document and collecting the supplementary materials.

Section Responses:

The following represents reflections on a section-by-section basis, presenting the strengths, recommendations, and concerns that were identified by the APRC. Where possible, we make note of specific page numbers to facilitate the usefulness of this review. The Council notes several strengths and areas of development for the department as they reflect on their successes and engage in strategic planning for ongoing growth. The APRC's response should be used in consideration in composing program reviews in future review cycles.

Natural Sciences – Section I: Department Mission & Alignment

Strengths

- The APRC commends the Department of Natural Sciences on its well-developed explanation connecting the program of Chemistry and Physics to the University and Department missions.
- The APRC commends the department's activities that support the University mission, especially its use of the High Impact Practices

Recommendations and Concerns

- Under 'Department and Program Uniqueness' (p 10), further explanation and justification that would clarify the differences between Biology and the HHP course offerings and curricular needs would be helpful.

- During the Prior Review, the Council expressed concern about Earth Sciences enrollment. What is the enrollment now? How has this been /will this be addressed?
- It would be helpful in future to note whether teacher licensure reciprocity is in place for students who satisfy Wisconsin DPI requirements. Can such students get licensed in Minnesota without further hurdles?
- Clarification of the status of 'accreditation' of the Chemistry program would be helpful. This seems to be a matter of semantics, as it appears the ACS 'approves' rather than offers a formal 'accreditation'. (Compare references on p 11, 19) What are the requirements to meet ACS approval? Does the program have documentation within program minutes of how the program has adjusted courses based on ACS recommendations?
- The Council notes that the mission as stated on p 6 does not match that given on page 3.
- Similarly, there is confusion about the date of the departmental merger (2009 on p 5, versus 2010 on p 1).

Natural Sciences – Section II: Helping Students Learn

Strengths

- The Council lauds the Natural Science Department's recruitment efforts, including the Chemistry program's efforts (p. 31) and the plans of the Biology program to recruit in high schools (p. 24).
- We commend the Biology program's learning outcomes and performance criteria (p. 20). Biology also shows exemplary attention to enrollment, completion, and planning (pp. 27-30).
- The model of peer review of examinations (p. 19) for purposes of improving the assessment of student learning is an interesting practice. The Council suggests that these efforts be shared with colleagues beyond the program or department.

Recommendations and Concerns

- In section 3, the Chemistry program should present results of the ACS exam or similar measures of student success to bolster the narrative.
- In the area of Academic Preparation, the Biology and Chemistry/Physics programs specifically note (pp. 35-36) that mathematical preparation is important for students in these fields. The Council therefore recommends greater collaboration between the Natural Sciences and Math/Computer Science departments.
- The table on p. 32 showing the distribution of Chemistry graduates would be more significant if it contained a multi-year aggregation: with only 7 graduates in one year, the results for UWS are not statistically compelling. APRC recommends the program adjust frequency of course offerings to reflect the needs of real numbers of majors at the upper level.
- The department might consider examining changes in the number of advisees from fall to spring as a means of determining short- and long-term issues leading to non-retention.
- The Earth Sciences program appears to lag in its assessment efforts; perhaps the Biology program could be used as a model or provide mentoring to Earth Sciences.

Questions for Future Consideration and/or Clarification

- How is cost-per-credit computed? Does it include differential tuition offsets?

- How was the graduate survey for Chemistry/Physics majors conducted? Was it separate from the UW-Superior Career Services Office's graduate survey? In future, documentation and textual explanation of how the data was used would provide better support.

Natural Sciences – Section III: Accomplishing Other Distinct Objectives

Strengths

- We commend all the programs across the department for their consistent emphasis on the HIPs in their academic curriculum.
- We commend all the programs across the department for their emphasis on scholarship for both faculty and students.
- In the documentation of accomplishments of 'other distinct objectives' we would like to highlight the thoroughness of the response by Biology; this could serve as a model to other programs in the department.
 - We applaud the support of and work done by the student groups and community events by the department – one way to document the accomplishments of these organizations might be to track voluntary participation; documenting student and community involvement in organized events (such as science night) would be one way to demonstrate accomplishment.
- We acknowledge the concerns of the department regarding workload issues; this has been a consistent message across a variety of recent APRC reviews.

Recommendations and Concerns

- Generally, programs could work to improve the intentionality and thoroughness with which they approach the assessment and reflection on the progress made on their 'other distinct objectives'. There are several points (both for specific programs and, at times, the entire department) where specificity and content are lacking.
- At several points, Earth Sciences make reference to programmatic growth (i.e., developing an online minor, developing a full major). APRC would expect to see more detailed documentation of the demand for and costs for setting up these additional components within the program. We would like to encourage their continuing to discuss with regional colleges the options for a collaborative growth model.

Natural Sciences – Section IV: Understanding Students and Other Stakeholders Needs

Strengths

- The programs have a good sense of both the potential job market and opportunities for further education for their students. They are aware of both local and national markets and trends in employment. The use of the tables by Chemistry & Physics and Earth Sciences, however, was not particularly informative.
- The programs use multiple means to adjust curriculum. The Council particularly commends program instructor's and student's participation in the local community.
- The Council also recognizes the strong connection and dedication to individual student goals through advisement and co-curricular interaction.

- Earth Sciences, as minor-only, are particularly commended for their cooperative work to help students achieve their educational goals.
- The Council recognizes that a great deal of informal consultation and communication occurs between programs and ‘outside’ constituents, such as T Ed and DPI, as well as industry officials as well as in the response of local employers who request interns and potential job candidates.

Recommendations and Concerns

- As above, the Council would like to know more about whether Earth Sciences can support the request (with the data given) for “approval to offer an interdisciplinary licensable Earth & Space Science minor”. What would such a minor it look like? What data does the department retain to support the “re-addition of a science educator faculty position?” Could this data be employed to support creative program changes in order to retain students who are currently leaving to pursue majors not offered at UW-Superior?
- Overall, the Council encourages the programs to increase connections with Career Services to better document where their students are going.
- The Council recommends that the programs share successful methods for adjusting curriculum with other programs within the department, and explore commonalities among various stakeholders, especially developing more formal outreach to alumni in all areas. Biology in particular is encouraged to explore models of successful senior exit surveys.
- Programs express concern about our student profile, which indicates our students must often work for pay rather than fully participate in useful co-curricular activities. The Council encourages the department and programs to think creatively about how greater emphasis on the High Impact Practices within coursework might substitute for, or enhance such experiences.
- The Council reminds Administration of the importance of the stand-alone minors, and recommends they consider ways to spotlight value that is not easily documented by traditional means of ‘credit hour production’, particularly as the campus explores both enrollment and retention issues and implements formalized advising structures. Could we develop a more comprehensive advising model more emblematic of a liberal arts campus? Could it start with areas such as this, developing a formal arrangement to have dual advisement for minors?
- The Council recommends deeper consideration of the possible explanations for Earth Science general education courses which “...consistently fill and overrides are requested when classes in other disciplines still have openings.” Are the earth sciences perceived as an ‘easier’ course for non-science majors? Are the numbers the result of the complementary disciplinary nature of the courses? The General Education Committee should be alerted to any data related to these courses, so that they may more effectively strengthen our General Education offerings.
- The programs are encouraged to work with Institutional Research to examine ways to more formally analyze their data for continuous improvement, especially the use of new methods of assessment of student performance and its impact on satisfaction.
- Informal consultation and communication with ‘outside’ constituents is evident. We encourage the department and the programs to pursue formal performance and evaluation of feedback from these constituents.

Natural Sciences – Section V: Valuing People

Strengths

- APRC commends the apparently strong mentoring efforts in Earth Sciences and Biology, and encourages the sharing of successful models.

- Council commends the department and program commitment to the High Impact Practices and its support of Academic staff development in this, and other, areas.
- Biology is particularly commended for their explicit pursuit of new hires who show a wide breadth of content knowledge.
- APRC acknowledges the careful attention to faculty service loads so that they are not over-extended, especially given their support of grant-funded research.
- APRC notes the efforts of small forms of recognition to encourage faculty productivity.

Recommendations and Concerns

- In future, Council would like more detail at the department level about sabbaticals granted during the review period, and how they have been balanced across programs, as well as how the department or programs provided course coverage.
- APRC recognizes that the new format for program review is more data-driven, and that some questions require answers based on data not currently available or collected by the University. The APRC recommends that in future reviews programs provide fuller explanation of how faculty are supported within the department and the program. The APRC itself continues to work to provide a better Template that will allow streamlining answers and better alignment between various reporting mechanisms, such as strategic plans and annual reports.
- APRC supports the department's own assessment of the need to review and articulate a shared and unified set of goals in order to become even more effective. A high priority for the department should be review of its personnel rules and handbook in order to conform to UW System and campus standards and expectations, while still leaving flexibility for defining areas in the disciplines.
- While provision of First Year Seminars and other High Impact Practices is commendable, APRC recognizes the additional burden required of its faculty. The Council cautions the department to consider long-term balance both of course and student loads among faculty within programs as well as distribution across all programs in the department.
- APRC recommends Biology confer with administration about the use of 'seniors as teaching assistants', as courses must be taught by persons holding a degree above the level of its students (except in the case of terminal degrees). The use of peer mentors to perform routine activities under the direct supervision of a faculty or staff member may be appropriate. [This may be a matter of poor semantics, as in the use of the term, 'ACS accreditation', above.]
- APRC recommends Biology further explore mechanisms to release or provide for a part time Laboratory Manager position.

Natural Sciences – Section VI: Department Planning for Continuous Improvement

Strengths

- Each program has developed 3-5 year assessment plans and has developed and begun to assess student learning objectives.
- APRC commends Biology for not merely assessing their own students, but comparing those outcomes to assessments at other institutions. APRC applauds the departmental goal of having each program assume responsibility for retention and recruitment.

Suggestions/Concerns

- Chem/Physics: Provide a copy of the program plans, or the data to which you refer.

- APRC recommends examination of assessment across programs, and looking to external agencies (like ACS) to identify common elements for learning outcomes.
- APRC is concerned that the department still seems unable to find common ground. While departmental strategic planning is identified as a priority, APRC echoes the departments' own concern that inadequate time is being dedicated to meeting as a whole department and addressing departmental issues. APRC encourages further intentional movement to develop common ground.