Departmental Summary

The Math and Computer Science Department supports the mission of UW-Superior in fundamental ways, through course offerings in the mathematics core requirement of the General Education program, through implementation of high-impact practices, and by fostering student-centeredness and student engagement in its programs. The department's programs complement each other, especially with respect to curriculum between Math and Computer Science, with ITS faculty supporting the department's technology needs.

The programs (especially Computer Science and ITS) should look closely at assessment of student learning and program-level evaluations, as outlined below. Planning for improvement and faculty/staff development (valuing people) are areas that merit attention as well. With relatively few graduates per year in its majors and minors, the department should consider streamlining its curriculum and/or ways to recruit more students; the department should take advantage of the high demand for STEM majors and related availability of grant funding for STEM programs to explore ways to coordinate and enhance recruitment efforts.

Mathematics (major and minor)

A combined self-study was submitted for the Mathematics major and minor programs. While a combined self-study is acceptable for some Academic Program Review sections, this made it difficult to review program-specific sections, such as student learning outcomes and assessment process and program plans for improvement. If there are absolutely no differences between the major and the minor program, this should be stated in the departmental summary.

The self-study is missing several APR sections: departmental executive summary, valuing people, and plans for improvement.

<u>Strengths</u>

The Mathematics program has a well-designed and comprehensive curriculum, with a diverse set of rotated elective courses that meet student needs and interests. The program also periodically reviews its course offerings to ensure its alignment with professional and market developments and needs.

Over the last decade, the program reported increasing enrollment (but the program did not cite a source for this information). The APRC notes that reporting pre-engineering students as Math majors may adversely affect retention figures reported for the Mathematics program, as these students should transfer before graduation.

The department is a significant supporter of the General Education program, with 71-75% of Mathematics credit hours dedicated to General Education courses. The program also supports other programs on-campus by providing specialized mathematics courses to students in other majors.

The program actively engages students in high impact practices, including Writing Across the Curriculum, Global Awareness, Senior Year Experience, and Undergraduate Research, Scholarship, and Creative Activity (URSCA).

The program has a very comprehensive set of student learning outcomes and a well-established and documented assessment process. It is not stated whether assessment results refer to the minor in addition to the major.

The department developed and employs innovative advising tools to ensure students' successful and timely completion of the program. Specifically, a visual flow chart was developed that clearly shows the path a student must take (in terms of course sequence) to graduate and which helps reduce the likelihood of advising errors.

Recommendations

The department has a newly established mission statement (approved on September 22, 2014). The APRC commends the department for establishing a mission statement and recommends using it in the future as a guide of the unit's goals, actions, and decisions.

The department indicates that course evaluations are used to determine student satisfaction with the program as a whole. The APRC recommends that the program develop a student exit survey or interview to study student overall satisfaction with the program, since student evaluations of teaching reflect on performance of individual instructors and not the entire program.

The department has a history of regularly offering courses on unpaid overload basis. While these courses do not present financial costs to the university, they do have a direct impact on human resources, i.e., take up faculty time, and thus impact faculty and staff performance. Therefore, unpaid overloads should not be used on a regular basis, should not be expected of faculty, and the department should carefully consider the cases that require such unpaid overloads. If overloads are necessary, the department should submit overload payment requests to administration.

Instructional credit loads among faculty and academic staff appear to be different from the standard 12-hour credit load, but this variability was not discussed. Variations need to be explained and adjusted, as prudent.

Program faculty stability is of concern. According to the program prioritization report, temporary staff accounted for 23% (PPP, Criterion 4A, p. 4) of departmental FTE. Since the self-study is missing the APR section on valuing people, it is vital that the program assess its faculty stability and develop plans for improving faculty retention. The program should also work with the administration to fill the open tenure-track lines, so it can reduce the need for temporary instructional staff. Instructional stability is important for the quality of the program and the program's ability to offer courses, so students can graduate in a timely fashion.

Renewed market interest in STEM majors and a national strategy to promote STEM studies will clearly play a role in student enrollment in Mathematics in years to come. To ensure the university participates

in this STEM enrollment trend, the APRC recommends the program develop an action plan to attract new students into the program.

Summary

The Mathematics program has a well-designed curriculum and participates in High Impact Practices, promoting the university's mission and values. There are, however, areas which need further attention as outlined in the recommendations section above.

Computer Science

Strengths

The Computer Science program is well-aligned with the mission and values of the institution. The program has also implemented the key strategic priorities of the university through the embedding of a number of the High Impact Practices into the curriculum (Experiential Learning, Writing Across the Curriculum, SYE, and URSCA). There are also developments to extend their involvement in the HIPs through the introduction of a First Year Seminar, though it is unclear how far along the program is in the process.

The program also makes a strong contribution to the General Education productivity of the university, accounting for 1.5% of all Gen Ed credits generated (PPP, p. 6), especially in light of the small number of FTE in the program.

The program is also appropriately responsive to changing industry standards and needs. This is seen in revisions to the overall curriculum, the content of specific courses, and the types of internships and research opportunities afforded to students. This investment in staying current in both the academic and applied worlds of the discipline is not inconsequential and could serve as a model to other programs on campus.

It is clear that the program values strong faculty-student relationships such as the "Get Togethers" (dinner events), the programming competitions, and the faculty/student trips to regional conferences. Student engagement of this type has been shown to benefit student retention and long-term success.

Finally, the program has also identified unique relationships with other disciplines that have the potential to help the university reflect a more interdisciplinary approach to higher education. For example, some Visual Arts majors select the Computer Science minor (or major) as a way to build their employability or eligibility for graduate school in the graphic design area. We would encourage further interdisciplinary relationships of this sort.

Recommendations

There are several areas where inconsistencies exist between the program prioritization documents and the APR document. For instance, in the program prioritization document (p. 9), statements are made that program-specific student learning outcomes are a part of the syllabus for each class (which the APRC would support, as a pedagogical strategy). However, on page 22 of the APR document, the only discussion of communicating student learning outcomes to students is to explain that they are discussed at department meetings. If it is not the case that programmatic learning outcomes are a structural component of course syllabi, we would encourage that to be done. Secondly, it is not clear what, specifically, has been assessed by the program (e.g., either program-specific student learning outcomes or the former LELGs). Items in the APR document imply assessment of communication skills occurred, but there are no details of how that was done, what was learned, and whether outcomes other than communication have been assessed. On page 9 of the program prioritization document, though, a

process of changing requirements of the Senior Capstone to eliminate loopholes is described; was that in response to specific assessment work? Greater clarity would aid in understanding what the program has done around assessment and how those results have led to any changes in the program or curriculum.

Finally, there is a very brief mention made of converting the comprehensive Computer Science major to a non-comprehensive major, with specific required minors (Math or ITS; APR, p. 32). It is not at all clear why this is necessary, what structural problems it would solve, and what impact on students this would have, if any. If this is legitimately being pursued, more extensive justification for this needs to be demonstrated.

Summary

Overall, the Computer Science program embodies much of the mission and values of the university. The implementation of multiple High Impact Practices, fostering of interdisciplinary relationships, and practice of maintaining relevance of curriculum (and experiential learning opportunities for students) are all features to commend. Within those competencies, though, there are elements to continue work on, particularly around the consistency of communication, assessment, and structure of the program.

Information Technology and Systems (ITS)

Strengths

The ITS minor program provides valuable professional skills which complement a wide variety of majors, and there is evidence that students benefit greatly from these skills in the real world. The program has a remarkable record in Academic Service-Learning, where it has been ahead of the curve in partnering with the community to provide services such as web development. Of the other High Impact Practices, the ITS program contributes directly with one course, ITS 380, which is certified for Global Awareness (PPP, Criterion 5C, p. 4).

The ITS faculty also serve the MCS Department by applying their specialized skillset to the demanding conditions prevailing in that highly technical department, supporting the hardware and software needs of the department.

Student enrollment and graduation in the program have just recently reached sustainable levels, with a 100% job placement rate for graduates (PPP, p. 8), although there is mixed evidence that demand for the ITS minor will continue to be strong (NACE Job Outlook 2013 Report, Figure 16, p. 16; Employment Outlook.docx, p. 1).

Recommendations

As the ITS program moves ahead in developing its processes for assessment of student learning (APR, pp. 37-38), it will need to go beyond summative assessment (as in the capstone course only) to formative assessment in the lower-division courses. When this occurs, the program may find that the relatively large number of elective courses corresponding to each learning outcome (APR, p. 37) will make course-embedded assessment more difficult. Thought should be given to a milestone approach in which assessment can be carried out after each significant stage of progression through the ITS program, so that program-level assessment does not need to be carried out separately in each offering of each course.

While it is understandable, given the size of the program (two full-time faculty), that no formal advisement plan exists (APR, pp. 38-39), with the recent addition of minors to advisee lists, it may be a good time for the ITS program to look into making such a plan. Similarly, a plan for setting objectives (APR, PPP Criterion 10, p. 40) and for determining the need for faculty resources should also be established. The improvement priorities stated for the program (APR, p. 44) address not a specific target but rather an arena of interest; the program would do well to set specific improvement goals as a way to benchmark and track progress over time, as well as to provide a framework for resource requests.

The disparity in student credit hour production between the two ITS faculty (APR, p. 46), which is at a ratio of more than 2:1, should be investigated or explained further: what is the course release percentage for the MCS Chair? Does one of the faculty members tend to teach more sections of bigger (lower-division) courses than the other, and if so, why?

It is noted that there has been no budgetary support for the important work of the ITS faculty in maintaining the technological infrastructure of the MCS Department (PPP, Criterion 4D, p. 3). The APRC recommends that the MCS Department build in some form of support in the future.

Summary

The ITS minor program has established its initial goals after transitioning from the former CIS program in 2008. Continued progress in assessment of student learning, setting and carrying out prioritized goals, and drawing up a faculty development plan, along with course load analysis, will be positive steps in the program's future. The ITS minor program has only recently begun graduating students in the minor, and continued monitoring of the program's graduation numbers is recommended.