**Executive Summary of Program Assessment**

**Campus:** St. Louis

**College/School:** College ofArts and Sciences

**Academic Unit:** Department ofMathematics and Computer Science

**Date Submitted:** July 15, 2013

**Person Responsible for Success of Program:** Prabhakar Rao

**Submitted by:** Pat Dolan, Special Assistant to the Vice Chancellor for Academic Affairs

**Degree Programs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Degree (e.g., BS, MA, PhD)** | **Degree Program** | **Enrollment** | | **Number of Degrees Awarded** | |
| **Most Recent Fall Semester**  **2012** | **5-Year Fall Semester Average** | **Most Recent Academic Year 2013** | **5-Year Average** |
| BA | Mathematics | 34 | 34 | 11 | 11 |
| BS | Mathematics | 60 | 53 | 13 | 11 |
| MA | Mathematics | 20 | 20 | 7 | 6 |
| PhD | Applied Mathematics | 14 | 11 | 1 | 1 |
| BS | Computer Science | 240 | 190 | 21 | 17 |
| MS | Computer Science | 36 | 41 | 10 | 16 |

**Changes Since Last Review**

The following list includes the main changes incorporated in the past five years, some in response to the last five-year review report:

1. The Computer Science curriculum was re-designed and introduced from Fall, 2010.

The main changes include:

• Addition of the following new courses: CS 1012 Learning to Program Using Virtual Worlds, CS 4030 Introduction to Intelligent Web, CS 4340 Introduction to Machine Learning, CS 5030 Intelligent Web, and CS 5900 Graduate Internship in Computer Science.

• Changes to the prerequisites, description, number or title of 30 computer science courses.

• Several courses that were not offered in a very long time were dropped from the curriculum.

2. A new certificate program in Actuarial Studies has been introduced.

3. Three new math courses were introduced: Math 1021 Choice and Chance (with the cooperation of the Department of Philosophy), Math 4010 Financial Mathematics I, and Math 4020 Financial Mathematics II.

4. Prerequisites of Math 1020 Contemporary Mathematics and Math 1030 College Algebra were changed, allowing students more options for entry into those courses.

5. A three-year course rotation schedule was made available on the department’s web site for advance planning by students.

6. More space for graduate students is now provided, but we are not yet able to give desk-space to all of our graduate students.

7. Work on restructuring the PhD program is underway (a proposal is under evaluation by the College of Arts and Sciences Dean’s office); a discussion on a joint UMSL-Missouri S&T PhD in Computer Science has been initiated.

8. We focused heavily on the use of technology-enhanced approaches in our lower division courses. We have extended and improved our performance on service courses; we now provide the highest undergraduate service credit hours in the entire campus, contributing to about 13% of total campus service hours and about 17% of CAS service hours.

9. Undergraduate CS course curriculum restructuring has resulted in better sequencing of courses, making it easier for students to satisfy prerequisites before taking higher-level courses. We also encourage double-majoring in math and CS, as well as a CS-major-math-minor combination.

10. The department runs a seminar series; computer science graduate students are now required to attend a minimum number of these seminars.

11. The old Math Lab was relocated as the Mathematics Academic Center in an attractive new location on the second floor of the Social Sciences Building. The Center offers undergraduate students free tutoring on lower-level math and math-related courses on a walk-in basis.

12. Free tutoring sessions (both physical and virtual) have been introduced for lower-level computer science courses at the department lab in ESH 316.

13. Both the 2008 Campus Review Team and the external expert pointed out the low research output of some tenured faculty members as a problem; they also indicated that the shortage of in-rank faculty would not help increase research productivity, especially since most faculty members often have to teach courses outside their research interests. Unfortunately, in light of increasingly reduced faculty strength and enhanced enrollment, we continue to have our faculty spread too thin.

**Strategies or Plans for Improving Program**

1. Undergraduate level:

(i) Our goal is to increase enrollment and improve retention without compromising on quality. In order to achieve this, we need better marketing of the strengths of the department; we lose students to community colleges and smaller four-year institutes in the St. Louis area. University recruiters should visit area high schools and give talks emphasizing our extremely competitive tuition rates and solid quality (we lose freshman students to schools whose programs are not as strong as ours – Truman, Southern Missouri State, Maryville, Lindenwood, to name a few).

(ii) We badly need to hire new faculty. Many of our lower division courses are taught by adjunct faculty, a fact that is not good for the long-term health of the department, nor conducive to building a name-brand reputation. Some of our adjunct faculty members are also adjuncts at competing institutes (e.g., Maryville University, Lindenwood, St. Louis Community Colleges). We need to get rid of the “teaching school” image and build on the research university model instead. Teaching by adjunct faculty and visiting faculty often leads to compromising rigor in foundation-level coursework (such as calculus, linear algebra, applied statistics or intro to CS), causing less-than-adequately-prepared students to move on to higher-level courses where they cannot cope well, resulting in a chain reaction of problems. Stop-gap solutions (adjuncts, visitors) that are being practiced by this department for the past 15 years cannot be a permanent strategy. This point was also stressed by the 2008 external reviewer.

2. Graduate level:

(i) We need to produce increased MS/MA output by increasing recruitment with effective advertising. For attracting PhD students, we need aggressive marketing of faculty research output (e.g., on UMSL’s web page, instead of showcasing, say, athletes). We lose PhD students to Saint Louis University and also to Washington University. While we are no match to Washington University, our PhD program is (arguably) at least as strong as SLU’s. One of our new proposals for broadening the PhD program in Applied Math (targeted primarily to out-of-state and international students, with emphasis on distance learning) is currently under evaluation at the college level.

(ii) For recruiting and retaining good domestic students we need more graduate teaching assistant (GTA) funding.

(iii) For international students who are already enrolled, we need more effective advertising of on-campus job opportunities. Currently, news of on-campus job openings spread by mostly word-of-mouth. In the past our students found on campus jobs on web development in the department of history, lab

assistantship in the business school, and computer maintenance support.

(iv) We need to explore, with inputs from the Office of International Students and Scholars, the possibility of lowering fees for international students (a substantial chunk of our graduate student body is Indian and Chinese).

(v) A severe shortage of research faculty prevents us from offering an adequate number of graduate-level courses. (The recent hiring as an adjunct of Tomasz Mozolewski, one of our ex-students, for covering a database course is just one example.) For more than a decade now, faculty members have no choice but to offer independent study and reading courses (not regular classroom courses) on a voluntary basis. We need to hire new tenure-track faculty – either in a new CS area (e.g., computer communication/mobile computing; distributed database systems) or to strengthen one of the existing areas. We have not had a single new computer science hire since 2003; last year we lost a computer science tenured position (Pelikan) and two computer science NTT positions due to resignation and retirement. The following data shows how we are shrinking:

2000: in-rank math 18 + CS 3 = 21, NTT 11 (10 math, 1 CS, 2 both)

2003: in-rank math 10 + CS 4 = 14, NTT 10 (8 math, 2 CS, 2 both)

2008: in-rank math 8 + CS 6 = 14, NTT 11 (10 math, 1 CS, 2 both)

2013: in-rank math 8 + CS 5 = 13, NTT 9 (all math, 2 teach CS, too)

Our total faculty full-time-equivalent (FTE) is 10% in CAS (cf. 14% contribution to credit hours). The single most important message of the last five-year evaluation by both the 2008 Campus Review Team (CRT) and the external expert was that almost all the ills that plagued our department could be traced to the faculty being “stretched too thin” and could be remedied by new hiring.

3. We will build a strong statistics program. We are in the process of hiring a new statistics tenure-track candidate.

4. We will aggressively seek external funding. For this we will create better coordination between the Office of Research Administration and the department’s faculty.

5. We need to work on a competitive salary structure for faculty members. Pelikan has recently been lured away by a huge salary raise, one that would be unthinkable going by recent trends in raises in this department. In the past this department saw faculty members leave for pastures that were greener by $25,000 or more. And in at least one case we failed to hire a strong candidate because we could not match a competing offer. The present salary levels of tenured faculty compare extremely poorly with those of their peers at comparable state universities.

**Other Comments**

Click here if you wish to include additional comments about program.