

## Mathematics Department Response to the External Visiting Program Review Team Report May 9, 2013

The Department thanks the External Visiting Review team for a thorough examination of the Mathematics Programs and Operation. The department currently has thirteen regular faculty and typically employs 22 adjunct instructors teaching over 30 courses a semester. We agree with the report's summary description that follows. The Department provides college level training for almost all degree seeking students via the General Education QL requirement. It provides Mathematics training for STEM Graduates and Math Majors headed for K-12 math teaching positions, mathematics, programming, and Statistics positions in industry and government, and for Math Majors and other majors intending to pursue advanced degrees in math as well as other STEM areas. The Department maintains an active research environment and also works extensively with in-service K-12 teachers. The regular faculty members (12.75 FTE) teach extensively, provide personalized advising to all math majors, provide research opportunities for majors, oversee pre-service teacher training activities, work with the local school districts to provide professional development for in-service teachers, engage in outreach activities for middle and high-school students interested in STEM careers, and maintain active research careers.

We also agree with the Team's finding that the Department is exceeding expectations in these activities, but that the situation is not sustainable. Despite substantial enrollment increases over the past decade (currently over 5000 a year), the size of the regular faculty has shrunk. The Department requires additional regular faculty, and additional advising support. "Without additional resources, the Department will be forced to employ more adjunct faculty, increase class size (if larger rooms are available), and scale back the attention it can provide the students it serves across the board. Student success rates will be compromised. If the central administration does not respond to the needs of the Department of Mathematics, the training and retention of all STEM majors on campus will suffer considerably, as will the training of future K-12 teachers of mathematics."

Indeed, the math program already has bottlenecks for STEM majors and inadequate training for some upper level courses in terms of inadequate prerequisites for a least two key courses. Some courses for majors are only offered once a year or some only every other year. The calculus courses, fundamental for all STEM majors are experiencing unprecedented enrollment growth. The department offices receive regular requests (petitions with 20 or more student signatures) for additional sections or repeat offerings of the Calculus 3 course and the post calculus courses, Linear Algebra, Differential Equations, and Statistics. We are challenged to open additional courses. When possible, we are only able to do so by shifting regular faculty from lower level courses and hiring adjuncts. Sometimes we are unable to open additional courses due to the lack of qualified faculty. Larger rooms and increased enrollments to 40 or 50+ are the only alternatives. In addition Math Majors have reported that their graduations have been delayed a year due to limited advanced offerings.

### **Strengths**

The review team found that the regular faculty are highly engaged in teaching the students they serve. They provide an outstanding education for their majors, extensive undergraduate research opportunities, and a high quality experience for non-majors in their service courses. The greatest strength is the expertise and

dedication of the faculty. In addition the Department pays considerable attention to their service courses, particularly courses like Math 1050 (College Algebra) and Math 1210 (Calculus I) which are heavily subscribed by STEM majors. The success rates in Math 1050 are impressive: roughly 75% of students receive grades of C or higher. These success rates are demonstratively not the product of grade inflation.

To these strengths we add the accessibility of faculty. Students often make the comment that they like the accessibility and extra help they receive from faculty.

### **Areas of Concern**

We concur with the review team's finding that there are three main areas of concern. The Team gave recommendations (below) for addressing these areas:

1. The faculty are overwhelmed by enrollments. As a result they can only offer some of the core courses for majors once a year (or in some cases once every other year).
2. The advising that students receive,
3. Maintaining uniform standards across departmental offerings due to the employment of large number of adjuncts.

### **Recommendations**

Below are seven specific recommendations the report made with the department's response to each.

1. Hire extra Faculty

"The most pressing challenge facing the Department is the need for extra faculty resources. We urge the central administration to take this seriously."

**Response:** The department agrees and makes yearly appeals for extra faculty to teach courses at all levels and foster cross disciplinary programs. We lost two faculty at the end of the 2011-2012 academic year. We were only able to replace one of those this past spring. The incoming faculty will address some of the needs in the service courses for elementary education majors and hopefully also increase and improve relations with the local K12 public school system. We currently have verbal approval to start early on a search for an additional faculty member during the Fall, 2013.

There are several ways in which the need for additional faculty could be addressed. The department could hire contract faculty to teach 15 credit hours of lower level (below Calculus) or Calculus courses. The advantage, besides being of lower cost is that it would free up regular faculty time to teach post calculus and upper level courses. But there are several disadvantages:

- a. many majors are attracted to Math because they have had contact with regular faculty in lower level courses,
- b. regular faculty concentrate more on concepts and try to instill in students the realization of math as a language as opposed to a set of rules for computation,
- c. upper level courses require more preparation than lower level courses so this will seriously detract regular faculty's time for service and scholarship,
- d. such contract faculty positions are not very attractive, the contracts are for a year, and the faculty demography will become tiered, elite versus workers,
- e. hiring contract faculty to teach calculus and post calculus courses requires additional oversight by the regular faculty.

The optimal way to cover courses, strengthen the current programs including undergraduate research, increase the number of and the support for STEM majors, foster cross disciplinary programs, and increase connections with the public schools is to hire additional regular high quality faculty with the ability and aspirations to pursue at least a few these objectives.

2. Pursue Grants

“The Department should pursue external funding opportunities, like the NSF's Noyce Grants, in order to build capacity. Reassigned time should be given for this purpose. They should consider bringing in consultants such as PI's on existing Noyce Grants in Utah.”

**Response:** We are interested in applying for capacity building grants. This was recently discussed in department meetings. Some faculty thought that grant writing required huge time efforts, even with reassigned time for that purpose. Reassigned time also exacerbates the adjunct problem. There are very few adjuncts available to fill the increased need to cover daytime courses. Regular faculty were more interested in writing grants to support their scholarship, travel, and conferences. It appears that such grants would need to be mainly done by the department office, but that office is overwhelmed with student requests and administration. Increased efforts on writing and obtaining grants are taking place in Dean's Office. Several faculty have worked with the Dean on these.

### 3. Increase Advising

The review team recommends increasing personalized advising for the purpose of recruitment and retention.

**Response:** The department has instituted a new program which assigns each math major a faculty advisor/mentor. Plans are underway to have advisors contact and check the progress of their charges. The department is considering ways to increase recruitment. During department meetings, the Chair led discussions about the programs and the numbers of majors that were being attracted.

The team also recommended hiring advanced undergrads to advise majors just starting in the program. This is under consideration but would require increases in the hourly wage budgets. This type of peer advising may already be taking place via the very active math club.

The team also recommended hiring hourly wage students for some of the routine administrative tasks. The department office has begun doing this. For example, students have been hired as office helpers to answer the phone and help with the prerequisite checks after the grades are recorded. Note that they do not make any decisions; they apply a set of rules.

### 4. Alternative approaches in the gateway courses, Math 1050, 1210

The team encouraged the faculty to pursue alternative approaches in these courses which would further build on their strong success rates. Alternative approaches should be studied for effectiveness and then modified, discarded, or expanded as appropriate.

**Response:** As the report noted the success rates in the lower level courses are high. Many faculty are trying new things such as group work, writing projects, bridge courses, methods to encourage students to prepare for prior to classroom discussions (flipped classes) and other approaches. Discussions will continue to take place about the effectiveness. In the past, faculty have traveled to conferences and workshops on new approaches. Activities increased this past year. Faculty traveled in groups and individually to conferences about teaching approaches. More are planned for the upcoming year. Faculty are being encouraged to attend in groups and to plan their course calendars accordingly. This may require increased funding for travel, perhaps through the Dean's office. It should be noted though, that to implement successful approaches across all the lower level offerings will require additional administrative efforts to train the large number of adjunct faculty in successful approaches. Perhaps one way to accomplish this training is via videos of the Teaching Learning Forum sessions or other training sessions.

### 5. Uniform Exams

The team suggested implementing uniform final exams and possibly uniform midterm exams in courses up to and including Calculus I with a portion of multiple-choice questions.

**Response:** The department is considering the implementation of common exams. We will discuss this further. Such exams have advantages and disadvantages. The team report lists some of the advantages. Some of the disadvantages are that a course coordinator would be needed. Reassigning a regular faculty to this duty would

exacerbate the adjunct problem. In addition, scheduling the times and rooms for the common exams increases administrative duties and complicate and possible lengthen the final exam schedule. Coordination of the grading by the instructors would need to be done. The regular and adjunct faculty are using mostly work out problems on exams, homework, and quizzes because those type of problems more clearly emphasize that math is a language for description and problem solving. Multiple choice questions on some portion of the exams would be useful to reduce the work of grading.

#### 6. Institution of procedures for mentoring new faculty

The team recommended the institution of appropriate procedures for the orientation of new contract/adjunct faculty.

**Response:** The department authored, discussed and approved a new policy to orient and mentor new regular faculty during the Spring 2013. The mentoring is to be done by the more senior regular faculty.

The regular faculty have discussed the orientation and oversight of adjunct faculty several times over the past few years. Discussions on this took place again during the spring of 2013. The regular faculty continue to feel that this is an administrative duty that should be done by the chair or perhaps an assistant chair. The Chair has in the past tried to recruit a faculty member for oversight and evaluation of the adjunct faculty. So far the incentive has been reassigned time. But it seems faculty prefer teaching a course to oversight and evaluation of adjunct faculty. Such evaluation would include time spent traveling to the various WSU campuses and time in the evenings. Recruiting quality adjunct instructors and subsequent orientation, oversight, and mentoring remains a priority of the Chair.

#### 7. Strategic Plan

The report said "The Department would benefit from the development of a better strategic plan with clear priorities. This has been somewhat lacking (again largely because other pressing demands on the faculty have left no time for it)."

**Response:** The strategic plan was revised this last year. We devoted more time in department meeting to discuss priorities. We discussed the department's strengths, the number of majors, ways to recruit and retain majors, possible changes to the programs, and ways to increase effectiveness. We will continue those discussions so that a consensus can be found and a clearer ranking of priorities can emerge. This may be a difficult process due to the strong needs in several different areas and strongly held opinions.

To summarize, we will continue to follow through on the recommendations as best we can. The team suggested that we should use reassigned time to address several of the recommendations. This increases the number of adjuncts to cover daytime courses and the need for oversight/mentoring by the chair or faculty. Our overarching need is more faculty to address the needs in all the areas we serve, general education courses which also lead into upper level courses, service courses for STEM majors, courses for majors, pre and in service courses for teachers, community relations and training with the public schools, recruitment and retention of majors, and the formation of relations with the local employers in government and industry.