

Mathematics Program Annual Review Budget Update (Dec. 2011)

The five highest current priorities for the Mathematics Program are listed below, as well as the status of each item. These arose out of the most recent five-year program review, which was completed in spring 2011.

1. ***More computer lab, office, and class facilities (new science building)***

This concern is most likely on hold until a new academic building can be constructed. However, there will be a critical need for another full-time faculty office beginning in August 2012, when a new tenure track position is filled. At present, there is no space available anywhere for an office for this person.

2. ***New faculty member in the area of math education***

A national search is currently underway with about 130 applications thus far, although only about 17 appear to have credentials in the appropriate field of research: mathematics education. Final decisions on phone interviews and on-campus interviews will follow later in January or early February.

3. ***New faculty/staff member dedicated to improving CSQR course success rates***

There is an *extremely* pressing need for the current one-year non-tenure track full-time mathematics faculty member to continue (indefinitely) to coordinate the 20+ sections of MATH 102 Intermediate Algebra and MATH 104 College Algebra courses each semester. Frank Ives was responsible for several hundred hours in designing and implementing a standardized course template for MATH 102 which was used in 9 of the 12 sections in fall 2011, and is currently working on a similar system for all the MATH 104 College Algebra sections in spring 2012. We have changed both textbooks to accommodate the MyMathLab system, and we expect a study in January to show that this has resulted in a higher pass rate for MATH 102 students, reducing the need for sections of 102 in the spring taught by additional hired part-time faculty, and reducing time to graduation for many students. Frank has also taken on the role of faculty tutor in the LEC as part of his position, at considerable savings in what used to be paid to five other faculty members, although the faculty tutoring hours need to be expanded. We expect to see similar results for the 200 students enrolling in a new version of MATH 104 College Algebra this spring. In a nutshell, we believe that we can demonstrate a vast improvement in efficiency for students meeting their CSQR General Education graduation requirement over the old system, but it hinges on the presence of Frank's position, and more specifically, Frank Ives. Without that full-time position, most of the gains we believe we are making this year in the remedial math program will simply collapse.

4. ***Support for developing math single subject credential program, if so decided***

It appears that such a program would be beneficial, and this need will be met by the new faculty member being hired in mathematics education, and is so stated in the job description.

5. ***Applied Mathematics Lab for use by faculty and students*** (separate from the Fletcher-Jones Complex Dynamical Systems Lab (CDSL))

This need cannot be met until new space is identified, presumably not until a new academic building is constructed.

Note: there are two other budget areas which need increases which did not show up on the annual review or strategic plan because they simply involved increases in normal operating costs due to increased enrollments.

The first of these is the *Printing and Duplication* budget line 11026207, which has been set at \$5000 for the past several years. The total expenditure for 2010-2011 was \$6334 (over budget by \$1334), servicing 842 students in all math, physics, and NASC 102 classes for fall 2010. (These are the classes whose instructors are charged to this budget line for copying.) The total number of students serviced in all math, physics, and NASC 102 classes for fall 2011 was 985, a 15% increase, which one would then expect to result in at least a 15% increase in copying costs. In fact, the copying costs for July through November of 2011 (all the data I have for the current academic year) have increased by 17% from those of the same time period in July-Nov. 2010, from 51,600 copies to 59,408 copies. I am therefore requesting a 15% increase from the actual 2010-11 copying expenditure, \$6334, to \$7300, that is, a 46% increase from the current amount of \$5000. Even this will likely fall a short at the end of the 2011-12 academic year, but it should be fairly close. Anything less is not honest budgeting, and will force the money to come out other areas not intended for this purpose. Another way to look at it is that the annual duplicating costs in dollars per student were $\$4644/524 = \8.86 in 2009-10, and $\$6334/842 = \7.52 in 2010-11, and if we use this lower rate to predict for the current year, the expenditure would be \$7407 ($\$7407/985 = \7.52). Please note that the student numbers given here are for *fall semester only*, and in fact they should be roughly doubled for the entire academic year, meaning a total real expenditure of about \$3.75 per student in each class, that is, about 75 copies per student per class, a not at all unreasonable number.

The second of these budget areas is the *Other Student Wages* budget line (11026125). It was cut from \$7000 in 2010-11 to \$5000 this year, I suspect in part because we did not need or use it all that year due to a much larger than normal number of work study students who were available to grade papers for mathematics classes (and assist with physics labs). It has been our experience in the past that the students who are qualified to do this kind of advanced work usually do not have work study, and we very often must pay them out of department funds. This is again the case this year, and I expect to have to go well over the \$5000 budget cap for this year unless the Dean can put in some more money (as he indicated earlier this year that he would). The increase in number of students and the greater number of adjunct faculty hired (and proportionally greater number of adjunct faculty requesting paper graders) is straining the budget. I am therefore requesting that the 6125 budget line be increased from \$5000 back up to its 2010-11 amount of \$7000. The expenditure for this line is always a moving target with a wide range of movement, depending on the proportion of student workers who have work study funds but at least if there is money left at the end of the year, it is easily recovered by the Dean since it can never be transferred out of this account to any other budget lines.

Selected major recommendations for action are as follows (**dean**, **dept now**, **dept. later**):

1. *Seek to obtain a computer lab dedicated to mathematics classes, so entire classes could be either taught in such a lab, or taken in as needed for demonstrations and work on sophisticated mathematical software.*

This need cannot be met until new space is identified, presumably not until a new academic building is constructed.

Also increase the available space (MA 54) for mathematics and physical science majors to gather and collaborate with each other with appropriate computing facilities at hand.

This need has been met through the use of funding from the University to renovate FH 8 for use as a student laboratory/study area.

2. *Introduce a mandatory structured MATH 499 Senior Project class that would be taken for 4 units, but would only meet one hour per week, in order to force students to keep on schedule with their independent work and to give them a forum to discuss their work and practice presenting with other students. Publish a Senior Project Handbook in conjunction with this new course.*

Neither of these has been done, but there are no obstacles (other than time constraints on the part of the faculty to accomplishing them).

3. *Determine whether or not to continue requiring the GRE Advanced Subject Mathematics Exam for all mathematics majors, and whether to revise the in-house departmental exam.*

This is currently being considered by the department faculty.

4. *Institute required corequisite 1-unit lab courses for MATH 001, 102, 104, and possibly 170 and 105; staffing strategy unknown at this time, but could possibly be incorporated into the non-tenure track lecturer or instructor position mentioned in (2) above, in return for a load reduction.*

This would require a significant increase in staffing for the added lab sections, as well as adequate room space. Such 1-unit courses are not being considered at the present time due to resource limitations.

5. *Keep faculty and department web pages more up to date, more informative, and more interesting to our students.*

Although more work needs to be done, this is being dealt with in part by the university changing to a friendlier web system.

6. *Consider implementing some type of review course or workshop for students to help prepare for their senior comprehensive exam in order to boost scores and reduce first-attempt failures; also consider a workshop for CSET preparation.*

These have not yet been considered by the department since the program review.

7. *Determine whether courses such as MATH 315 Differential Equations, MATH 328 Abstract Algebra, MATH 410 Real Analysis, MATH 351 Probability, and MATH 352 Statistical Theory should be required core classes for all mathematics majors.*

This has not yet been considered by the department since the program review.

8. ***Institute a Career Night when former alumni could return to campus and speak to majors about employment opportunities for bachelor's degree holders. It might be possible to combine this with information about graduate schools from former or current graduate students in mathematics. Provide opportunities for mathematics students to obtain internships.***

This has been discussed but not yet fully considered by the department since the program review.

9. ***Revisit the decision to not apply for the state subject matter program in mathematics, and either affirm the previous negative decision, or else begin the application process.***

With the hiring of a new faculty member in mathematics education, this process should begin in fall 2012.

10. ***Obtain easy access for all (part-time and full-time) faculty to check math placement test scores for students in remedial math classes.***

No progress has been made on this yet; it requires resources of university programmers to make modifications to Web Banner.

11. ***Re-examine the Calculus II-III sequencing to make sure that it is serving our students as well as possible.***

This should be undertaken during the spring 2012 spring semester.

12. ***Actively seek out possibilities for enhancing the success of incoming STEM freshmen by being willing to participate in summer math camp activities.***

Faculty have indicated their willingness to participate in summer activities such as this. Several mathematics and physics faculty have applied for a grant from the II-VI Foundation for funds for faculty-student research programs in summer 2012, with a positive result leading naturally to a subsequent application for Science Summer Camp funds for the summer of 2013.

13. ***Consider whether or not to require probability and statistics in some form for mathematics majors.***

This should be undertaken during the spring 2012 spring semester.

14. ***Re-examine all prerequisites for mathematics courses, particularly courses for majors, such as possibly recruiting MATH 311 Calculus III students for MATH 351 Probability.***

This should be undertaken during the spring 2012 spring semester.

15. ***Consider developing a new general education mathematics (quantitative reasoning) course, or changing the content of MATH 104 to a more modeling-based curriculum, centered on environmental concerns.***

This has not yet been considered by the department since the program review.

16. ***Seek out ways to obtain tutors for more advanced mathematics classes, and/or work with professors to make them easier to talk to.***

This has not yet been considered by the department since the program review.

17. ***Work to maintain high MATH 170 Mathematics in Society enrollments as the most appropriate general education mathematics course for most students.***

The mathematics faculty and chair have worked actively through advising workshops, e-mailings to advisors, and campus conversations to advertise and promote MATH 170 as a desirable and (in most cases) more appropriate alternative to MATH 104 for the CSQR G.E. requirement, and enrollments have essentially doubled in the past year. Efforts will continue.

18. ***Forcefully recommend that all mathematics majors take CORE/INTD 320 The Mysterious Dance of Art, Mathematics, and Music.***

This is being done (quite effectively) by the mathematics faculty and chair.

19. ***Determine how to better evaluate learning outcome 5 on the interconnectedness of subfields within mathematics, perhaps via questions on the graduating senior surveys or alumni surveys.***

This has not yet been considered by the department since the program review.

20. ***Make it a habit to select several goals each May or August to focus on addressing for the upcoming academic year.***

This was not formally done in August 2011, but informally, several issues have self-selected themselves for consideration in the current year.

21. ***Institute an annual retreat of mathematics faculty to discuss key issues related to the program.***

This has not yet happened, and the timetable should probably be modified to a two-day retreat toward the beginning of each program review cycle, funded by the dean's or provost's office.

22. ***Encourage faculty to seek out course release time from the administration and Faculty Research Committee for research projects and curriculum development during the year or summer.***

This is done informally by the department chair.

23. ***Keep evaluating web-based online tutoring systems to see whether they might be appropriate for use by the Learning Enhancement Center, and encourage experimentation by faculty of online-based homework systems.***

This has been done extensively by Frank Ives for 2011-12, resulting in a majority of all the MATH 102 Intermediate Algebra (fall and spring) and MATH 104 College Algebra courses (spring only) classes being taught with the utilization of MyMathLab. An evaluation of the effectiveness of this system will be forthcoming in January 2012.

24. ***Promote collegial visits by faculty within the program, low-stress, with no written report, and a follow-up lunch to discuss the visit.***

This is done informally by the department chair, but should be encouraged more than it has been.