

MATHEMATICS CENTER

2012-2013

Background

The Mathematics Center is an integral part of the Mathematics Department. It began operation in 1992 as a means to improve the level of achievement in calculus and other core mathematics courses taken by a wide range of math and science students, to stimulate interest in mathematics, and to provide an intellectually exciting atmosphere for students. It has succeeded in meeting all of these goals. It is now the center of activity for undergraduates within the department.

The most noticeable accomplishment of the Mathematics Center is the tutorial service that is offered to students enrolled in the calculus sequence, linear algebra, statistics, and differential equations. The Mathematics Fellows, who are the tutors, also present workshops on the use of graphing calculators, and the small computer laboratory within the Mathematics Center is heavily used as instructors encourage their students to develop projects using computers. All of these services provide students with attention, tutoring, and early efforts to prevent failure. Students in all levels of Mathematics use the Center to discuss mathematical concepts and solidify their understanding of the material they are learning. The Center is one of the few informal academic spaces on campus, where the environment is devoted to studying mathematics and where students build relationships with others in their classes and in the department. The courses the Mathematics Center supports, especially the calculus and linear algebra series, are courses that are required by many of the science and engineering degrees and are often stumbling blocks for students. The Mathematics Center is one of the most important resources on campus for students in these courses. The popularity of the Center can be seen by the number of students using the Center. During peak hours, there are on average 20 students in the Center, which comfortably seats only 28. During less busy times when there are fewer tutors working, there are still on average 10 – 20 students using the Center.

One notable side effect of the Mathematics Center is the effect it has on the Mathematics Fellows themselves. The 21 Fellows who work at the Center form the core of the Mathematics Department undergraduate community. The Fellows are students majoring or minoring in Mathematics who are excellent in the classroom and have a strong desire to help others. Being a Fellow has the result of strengthening the background of the tutors as well as strengthening their communication skills. They also encourage each other to complete the most challenging and rewarding classes that the department has to offer. Many of the Math Fellows stay at Western to pursue a Master's Degree in Mathematics. These Fellows form the core of the graduate program. After their graduate work here, almost all either continue their graduate education or teach Mathematics at the Community College level.

The Director of the Mathematics Center is responsible for training the Mathematics Fellows and managing the operation of the Center. The director also functions in the Mathematics department as the Teaching Assistant Advisor. In that role, the director provides support for the Graduate Teaching Assistants who teach many of the lower level GUR courses in the department.

Budget Summary, 2012-2013

The Mathematics Center is staffed by 20-21 undergraduate students who work as tutors and by one faculty member, the Director of the Mathematics Center, who oversees the operations of the Center. The duties of the faculty member also include supervision and mentoring of the Graduate Teaching Assistants in their role as teachers, largely through regular classroom observations.

Budget for the Director of the Mathematics Center

Currently, the role of Director of the Mathematics Center is filled by a faculty member for 0.5 FTE.

Budget for the Operation of the Mathematics Center

The operations budget is currently \$49,007 per year. This money covers the wages for the student employees and for all supplies used by the Center. During the 2012-2013 fiscal year, three of the students who were hired as Math Fellows received work study awards that were used to pay their Math Fellow wages. Because these awards were not known at the time new fellows were hired, the total amount spent on student wages and expenses for the 2012-2013 year was only \$44,492.11.

Since 2009, there has been wage freeze on student employees. Math Fellows work at the level IV student wage category, which currently starts at \$9.50 per hour. Since 2009, minimum wage has increased from \$8.55 to \$9.19. In 2009, Math Fellows were being paid at a rate 11.1% higher than minimum wage. Now, they are only paid at a rate 3.6% higher than minimum wage. When the wage freeze is lifted, the pay scale will be adjusted, and the Math Center operating budget will be greatly affected.

General Operation of the Math Center

Math Center Use

The Math Center offers tutoring for Calculus, Linear Algebra, Differential Equations, Statistics, and other high level mathematics courses. The Center is open Sunday from 7pm to 10pm. Monday through Wednesday from 8 a.m. to 4 p.m. and 7p.m. to 10 p.m., Thursday from 8 a.m. to 10 p.m., and Friday from 8 a.m. to 9 p.m. Informal counts of the number of students in the Math Center are taken at fifteen minutes past every hour. During the 2012-2013 academic year, the busiest hours of the day were in the late morning and early afternoon, with an average of about 20 students per hour and some hours with more than 30 students during the hour. Over the year, Math Fellows worked a total of 5042 hours and over 22,000 visits by students were counted.

Initiatives for 2014-2015

An alumnus Math Fellow made a donation to the Math Center with the request that it be used to host gatherings during which a professor present a short, informal talk about an interesting topic in mathematics followed by discussion and snacks. The Math Center plans to host such a gathering each quarter that will be open to all students and faculty who are interested in the topic.

Mathematics Fellows – Selection

During the seventh week of winter quarter, notices are sent to the Mathematics Faculty to submit to the Director the names of students, other than those students who are already Fellows, whom the faculty considered to be outstanding in mathematics. These students are not necessarily math majors. Each of the students is notified, by email, of the recommendation and invited to submit an application. In addition, several students ask to be considered for a position as a Mathematics Fellow. These students are also notified by email and invited to submit an application. Since returning Math Fellows are not guaranteed a position for the next year, those who are returning to Western and continuing to take mathematics courses also submit new applications indicating a desire to continue. After the students who submit new applications are interviewed by the Math Center Director, their files are placed in the mathematics lounge for perusal and comments by the math faculty. The Undergraduate Committee of the Mathematics Department then meets to select the Fellows for the next year. This year, 41 students were nominated by faculty to be considered for Mathematics Fellow positions for the 2013-2014 academic year. This is evidence of both the outstanding students taking math classes and outstanding faculty support for the Mathematics Center.

Mathematics Fellows – Training

The Director of the Mathematics Center meets with newly chosen Mathematics Fellows each spring to introduce them to the Center and to the tutoring methods used. At the beginning of each fall, the Director meets with all of the Mathematics Fellows to discuss goals for the Math Center. The goals always include helping students using the center to become independent learners, getting the Math Fellows be involved with the department and establishing a sense of community among all math students. During fall quarter, The Director meets weekly with the Math Fellows to train them in tutoring and communication techniques and to help the fellows become better at asking questions and leading students to discoveries instead of showing students how to do the problems. The Director also reviews course material for the Calculus

series and the Math Fellows share different ways they have explained the material to students. Throughout the year, the Director observes tutoring to offer input for individual improvement and to determine the content of future training.

Letters of recommendation for Math Fellows

Although this aspect of the Director's position appears to be minor, it is a time consuming and important responsibility. The twenty or more Mathematics Fellows apply for scholarships, summer research positions, graduate school, and jobs.

Summary of Support Given Teaching Assistants by the Director of the Mathematics Center

Math 595 – Required Course for all new TAs (taught by the Director of the Mathematics Center since 2007)

The course objectives for Math 595 are to improve effectiveness of teaching assistants as instructors of undergraduate mathematics, particularly at the algebra and precalculus levels and to introduce teaching assistants to the curriculum they will teach. The course focuses on discussions of algebra and precalculus subjects with emphases on understanding the connections between the courses the TAs will be teaching and on how to present the material. The course also focuses on the use of technology in the classroom, especially the use of graphing calculators as an effective tool.

Math 595 meets for 4 full days prior to the start of fall quarter, then weekly throughout fall quarter. During the week prior to classes, the TAs practice teaching with a variety of different length presentations, from one problem in the board to a full practice lecture on material that he/she will teach during fall quarter. There are also many role plays and discussions of difficult situations that may occur and discussion of the role of a TA and the responsibilities involved. During fall quarter, the course focuses on helping the TAs develop as instructors.

Classroom visitations by the Director of the Mathematics Center

The Director visits each TA class at least once each quarter. New TAs are typically observed twice each quarter. After each visitation, Director meets with the TA to discuss the observation, provide feedback, and offer suggestions for improvement. These suggestions are followed up by conversations later in the quarter. The TAs often visit the Director to discuss difficult situations in the classroom or for advice on presenting particular material.

Assigning Classes to the Teaching Assistants

The Mathematics Center Director is responsible for assigning Teaching Assistants to courses and to lead instructors each quarter.

Act as mediator between lead instructors and TAs

In the role of Teaching Assistant Advisor, the Mathematics Center Director often acts a mediator between Lead Instructors and TAs. The Director also regularly checks in with each Lead Instructor to determine if there are any areas where TAs need additional training or support to successfully fulfill their duties.

Letters of recommendation

Although this aspect of the Director's position appears to be minor, it is a time consuming and important responsibility. The sixteen to seventeen graduate students apply for further graduate study and jobs. Many of the graduate students go on to teach mathematics at community colleges in Washington State. Since the Director is the only person who regularly sees the TAs teaching, the Director provides many references.