

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Department Name: *Mathematics*

Date Submitted and Academic Year: AY 2013-2014

Department Mission Statement:

Our Philosophy: The program in Mathematics at Potsdam is based on the premise that the study of pure Mathematics can be undertaken successfully by a large number of students if they are provided with a supportive environment. This includes careful and considerate teaching by a well-trained and dedicated faculty, continual encouragement, successful role models, enough success to develop self esteem, enough time to develop intellectually, recognition of their achievement, and the belief that the study is a worthwhile endeavor. We are dedicated to providing this supportive environment not only to our majors but to all of our students.

The Department of Mathematics is one of several making up the School of Arts & Sciences at SUNY Potsdam. The Department offers courses that support the College's General Education program, the various certification programs of the School of Education, cognates for other disciplines and, of course the mathematics major. The Department also offers the Master of Arts degree in mathematics.

Programs and faculty activities in colleges and universities are usually described in terms of teaching and advising, university service, and scholarship.

TEACHING AND ADVISING: This has traditionally been our primary concern and remains as such. Our teaching function can be further subdivided into:

Mathematics for Liberal Arts Students: We believe that the study of Mathematics by students whose majors and career objectives are not close to Mathematics is both liberal and liberating. These students should be encouraged to explore the true nature of Mathematics and, through understanding, to overcome any prejudices or negative attitudes they may have toward the discipline. Thus we continue to provide courses that these students *elect*, and maintain an atmosphere where students choose, and find enjoyment in, mathematics courses.

Mathematics for the Elementary and Secondary Education Majors: The mathematical training of the students who are preparing to be teachers is one of the most important responsibilities and contributions to the College's mission. Students in 7-12 secondary mathematics programs are also mathematics majors and benefit from the considerable time and effort we invest in that program. For this reason, we put forth our best efforts so that all our students, but especially these future teachers of our youth, learn some of the basic and deep concepts of mathematics, discover and appreciate its beauty, and become self confident lifelong mathematics learners. For students in Early Childhood and Childhood (K-6) programs especially, who may spend as little as 9 credit hours in our mathematics classrooms, we must employ our enthusiasm and passion for teaching and be the best model teachers we are capable of being.

Mathematics for other disciplines: A great deal of Mathematics has been developed in order to understand and to work effectively in other disciplines. We expect to continue to offer the appropriate experience in Mathematics for the students majoring in areas traditionally associated with Mathematics such as Physics, Chemistry, Biology, Computer Science, 3/2 Engineering and Economics, and in areas in which the use of Mathematics is somewhat less traditional such as, for example, Sociology, Psychology

SUNY Potsdam
Student Learning Outcomes Assessment Plan

and Anthropology. We believe that experience in classical Mathematics with its emphasis on precision, careful analysis, clarity of expression, and logical structure is the best basis for understanding and appreciating the wide range of applications of Mathematics in other disciplines.

Mathematics for Majors: The mathematics major is at the center of our program and our Philosophy. We are dedicated to our students and make every effort to provide the right learning environment and experience to allow them to become the best students of mathematics they can be.

The field of Mathematics itself is large and varied and therefore we cannot provide experiences in all of the various mathematical topics that they might encounter in their post-college experience. Nevertheless we believe we can equip students with the necessary intellectual maturity to succeed. Mathematics, as we teach it, is directed toward having students develop the necessary skills and attitudes to be able to solve problems *that haven't even been posed yet*. This represents what Education is all about. Given the effective restriction to a 33-hour major, we believe that students are best served by having them study traditional Pure Mathematics. The success of our students emphatically supports this belief. Indeed, alumni report that the training they received in our program prepares them well for graduate school and careers including banking, insurance, law, medicine, research and development, and all levels of teaching. Additionally, the 33-hour major allows many students to "double major" in Mathematics and another discipline of personal or career interest. Not only does this support the trend of increasing use of mathematics in all scientific disciplines, but also students seem to view this as a positive aspect of our program.

No discussion of teaching Mathematics at Potsdam College would be complete without mentioning the B.A./M.A. program. This program which allows students an opportunity to accelerate as rapidly as their ability and desire permit, continues to attract exceptional students to the college and the department. Although the number of students is small, we believe that the critical mass for successful continuation of the program can be maintained. We believe that the program is important, and the high achievement of the students is in the best of Potsdam's "Tradition of Excellence", and the State University's "Let Each Become All He Is Capable of Being".

UNIVERSITY SERVICE: We are members of the University and of the local community, and we should strive to be good citizens of each. Our students will benefit by seeing us as role models for good citizenship in the university and communities in which we live. We recognize that each of us has different interests, abilities and talents. Service usually takes the form of university, school or departmental governance but may include college and university public service, committee work, administrative work and work with students or the community in addition to formal teacher-student relationships.

SCHOLARSHIP: As our primary concern is teaching, we believe that the overwhelming majority of our time and energy is best spent on interaction with the students both in and out of the classroom, and in the careful and frequent evaluation of the students' work and progress. Nonetheless, scholarly activity beyond that related to the classes we are teaching is necessary to foster our continued intellectual growth--and we consider such growth to be a prerequisite to successful mathematics teaching. We encourage our faculty to pursue scholarly interests, knowing full well that we cannot duplicate the

SUNY Potsdam
Student Learning Outcomes Assessment Plan

atmosphere of a major university department and with clear recognition that our primary activity is teaching.

We believe that many forms of scholarship should be recognized and rewarded, and we encourage each member of the department to engage in the scholarly activities in which his or her greatest interests and talents lie. Scholarly activities recognized by the department include but are not limited to: writing textbooks or papers, reviewing books or articles, giving talks on or off campus, attending mathematical meetings or conferences, directing student seminars or independent studies, participating in seminars or workshops on or off campus, directing student research, developing new courses, professional consulting, writing grants or participation in grants, and deepening or broadening our understanding through studying journals or books. These activities may focus on mathematics, applications of mathematics, history of mathematics, mathematical education, or methods of teaching mathematics.

We do not want a rigid rating system to evaluate scholarship, but we do believe each activity should be weighed using these guiding principles. The merit of an activity is judged by its importance to the departmental and college community and also the regional, national and international mathematical communities. Furthermore, activities that have a good direct impact on our students or programs are highly regarded. Indeed, as teaching is our primary duty, we generally eschew activities that have a significant negative impact on our students.

When it is appropriate and feasible, we expect support for our scholarly endeavors in the form of travel funding, release time, and sabbatical leaves. Indeed, since we are so dedicated to teaching, sabbatical leaves in particular are necessary for us to realize our full professional potential.

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Intended Student Learning Outcome #1

Students will demonstrate knowledge of what constitutes a proof, be able to understand and construct proofs, and be able to give counterexamples where appropriate.

Connection to Univ/Dept Mission

Proof is central to all mathematics. In order to be able to recognize and construct good proofs, students will have to develop critical thinking skills.

Links with other programs/departments

- *Gen Ed Component:* Courses that emphasize proof will reinforce skills learned in FM and FC courses. In order to construct good proofs, students will have to engage their writing skills, thus reinforcing the FW and WI criteria of general education.

- *Related Courses:* All math courses, but especially upper division courses.

Measurable Criteria and Assessment Method(s)

In each of our part I classes, Math 375, Math 423 (or Math 671) and Math 451(or Math 691) the instructor will measure our students' achievement towards two of their course learning goals. These goals and the measurement tool should be chosen to aid the department in understanding our students' progress toward this Intended Educational Outcome. The instructor may use one or two quizzes, questions on a test, or some other appropriate measurement of their design. However, the measurement should be done in class and on an individual basis. The results will be scored using a standard rubric (see the Appendix of our Assessment Document) and submitted to the department assessment coordinator. A bank of previously used assessment problems is available for department members on our shared Helios folder.

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Intended Student Learning Outcome #2

Students will demonstrate use of the language of mathematics correctly to communicate both orally and in writing.

Connection to Univ/Dept Mission

In order to be able to solve problems, students need the skills necessary to communicate their solutions to others—otherwise their work is meaningless.

Links with other programs/departments

- *Gen Ed Component:* Being able to understand proper use of mathematical language reinforces the FM criterion of general education. It also reinforces writing, which reinforces the FW and WI criteria, as well as speaking (the SI criterion).

- *Related Courses*

Every mathematics course. Math 340 is a WI course, and Math 460 is an SI course. Math 698 is usually an SI course.

Measurable Criteria and Assessment Method(s)

In each of our part I classes, Math 375, Math 423 (or Math 671) and Math 451 (or Math 691) the instructor will measure our students' achievement towards two of their course learning goals. These goals and the measurement tool should be chosen to aid the department in understanding our students' progress toward this Intended Educational Outcome. The instructor may use one or two quizzes, questions on a test, or some other appropriate measurement of their design. However, the measurement should be done in class and on an individual basis. The results will be scored using a standard rubric (see the Appendix of our Assessment Document) and submitted to the department assessment coordinator. A bank of previously used assessment problems is available for department members on our shared Helios folder.

In Math 460 (or Math 698), the student will make an oral presentation to help further assess this outcome. The results will be scored using a standard rubric (see the Appendix of our Assessment Document) and submitted to the department assessment coordinator.

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Intended Student Learning Outcome #3

Students will demonstrate abilities to learn mathematics independently and read mathematical literature with understanding.

Connection to Univ/Dept Mission

We want students to be able to continue learning beyond their college years. This outcome ties in with the College Mission statement very well, as we want to “prepare[] students to act as engaged global citizens and to lead lives enriched by critical thought, creativity, and discovery.

Links with other programs/departments

- *Gen Ed Component:* This outcome reinforces FC skills, as well as FM skills.

- *Related Courses:* All mathematics courses, especially those numbered at or above 452.

Measurable Criteria and Assessment Method(s)

At this point, we have chosen not to measure this outcome directly. We plan to discuss this at our annual assessment meeting, based on anecdotal evidence from our classroom experiences, and from our graduates’ experiences in graduate school and the workforce.

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Intended Student Learning Outcome #4

Students will demonstrate a positive attitude towards mathematics and approach challenging problems with enthusiasm.

Connection to Univ/Dept Mission

The core of our department philosophy is that the study of mathematics can be undertaken successfully by a large number of students if they are provided with a supportive environment. We believe our majors' attitudes will be, in large part, a reflection of the environment we provide.

Links with other programs/departments

- *Gen Ed Component:* At present, our general education program does not have courses that relate directly to attitude.

- *Related Courses:* All mathematics courses.

Measurable Criteria and Assessment Method(s)

In Math 460 (or Math 698), the students will undertake a **reflective writing assignment** to help assess their attitude towards learning and doing mathematics.

SUNY Potsdam
Student Learning Outcomes Assessment Plan

Intended Student Learning Outcome #5

Students will demonstrate a fundamental knowledge of the advanced areas of Algebra and Analysis.

Connection to Univ/Dept Mission

Algebra and analysis comprise the heart of pure mathematics. As we state in our position paper, we want our students to be successful in their study of pure mathematics. One cannot learn a subject area without content. Such content gives the students some framework for understanding the world, and acting as “engaged citizens,” as our College Mission Statement indicates is part of our mission.

Links with other programs/departments

- *Gen Ed Component:* Reinforces concepts learned in FM, FC, WI and SI.

- *Related Courses:* Math 423, 523, 451, 452, 375, 526 and 460.

Measurable Criteria and Assessment Method(s)

In each of our part I classes, Math 375, Math 423 (or Math 671) and Math 451(or Math 691) the instructor will measure our students’ achievement towards two of their course learning goals. These goals and the measurement tool should be chosen to aid the department in understanding our students’ progress toward this Intended Educational Outcome. The instructor may use one or two quizzes, questions on a test, or some other appropriate measurement of their design. However, the measurement should be done in class and on an individual basis. The results will be scored using a standard rubric (see the Appendix of our Assessment Document) and submitted to the department assessment coordinator. A bank of previously used assessment problems is available for department members on our shared Helios folder.