

Snow College

Mathematics Program Review

submitted to the Snow College Board of Trustees
October 2015

Reviewed spring semester 2015 with a rating of recommended.

Reviewers:

- Dr. Christine Walker, Ed.D., Professor of Mathematics, Utah Valley University.
- Melanie Jenkins, Dean of Humanities and Assistant Professor of English, Snow College.

Program Description:

Snow College's Mathematics program serves the needs of more than 1700 students each semester in courses ranging from pre-algebra to differential equations. The number of mathematics majors is few; the program is primarily a service program offering general education mathematics courses required of all students seeking the associate degree. The program also offers service courses such as the three-semester Calculus sequence to students studying engineering or the sciences, as well as mathematics courses for pre-service elementary school teachers. Additionally, the department has been helping to increase the success rate of students who must take remedial math courses due to a weak math background or a significant time lapse since a math course was taken, so that they are able to complete their GE requirements.

Instruction in mathematics has been a part of Snow College since its inception in 1888 as an LDS Stake Academy. The evolution of the mathematics department has followed the evolution of math and mathematics instruction with the same vision and faculty expectations. The vision of the mathematics department is to provide students with the educational opportunities they need to develop the mathematical background necessary for them to be competitive in their careers and contributing members of society. All math faculty are expected to have a stellar knowledge of their respective math subject area and its real-world application, a tradition of excellence in teaching, support for developmental and general education math course instruction, an innovative approach to using math in other departments and across disciplines, and a general desire to help students succeed at math.

Mission Statement:

The mission of the Snow College Mathematics Department is to: provide high quality math instruction for students majoring in mathematics, mathematics education, or other scientific areas; provide all students with a basic knowledge of mathematics in order to be competent members of society; provide students in need of remedial mathematics the opportunities they require to develop their basic mathematical skills.

Faculty and Staff:

Instructional quality is achieved by requiring all mathematic instructors for college-level courses to have a master's degree in mathematics or a related field. In addition, most mathematics faculty have been observed by the department chair and received feedback on their teaching. Finally, the program maintains

a strong commitment to faculty professional development by membership and active participation in AMATYC, the American Mathematical Association of Two-Year Colleges, AMA, the American Mathematical of America (MAA), and other such organizations, as well as participating in faculty development opportunities on our own campus or at other nearby sites in the state.

In order to place a student in the correct mathematics starting course, the mathematics program uses state-wide placement guidelines such as ACT and Accuplacer scores, either of which have been proven to correctly assess that a student is prepared for a given course prior to registration.

Student Learning Outcomes:

Students who study or earn a degree in mathematics should be able to work in the following areas:

- **Teaching:** Mathematics majors who earn a Bachelor's degree and certification in secondary education are usually eligible to be high-school mathematics teachers. With a Master's degree, mathematics majors are eligible to teach in a two-year college. These levels usually emphasize the teaching of beginning mathematics areas (algebra, calculus, linear algebra, and statistics). With a doctorate, mathematics majors are eligible to teach in a four-year college or university. College professors may choose an area of specialization, which is usually related to their doctoral studies; they are also expected to continue to pursue research studies.
- **National Security Agency:** The NSA is currently the largest employer of mathematicians in the world outside of education. This often has to do with code-making and breaking, but they are hired for other reasons
- **Think Tanks:** Several corporations (private and government run) hire mathematicians and other science types to create and think and work. If a thinker can produce an idea that can be used even once in a decade the company feels the investment has been well worth it.
- **Statistics and Actuarial Science:** Insurance companies and cities, among others, hire these mathematicians to help them predict and project as they do long-term planning.
- **Cities, Corporations, etc.:** Mathematicians are hired to help cities and others do "management science/planning." Aspects of game theory and social science mathematics help to do the job.
- **Biological Sciences, Computer Sciences, Wild-Life Sciences, etc.:** Many large science concerns hire mathematicians to do the parts of the experiments that require mathematics. This includes topography and GPS work and range-life studies. Mathematicians can work and use their knowledge in hundreds of areas.

Several years ago the math department promised college administrators their classes would not "bottleneck" student progress toward a degree or transfer. Since that time, the number of math sections has grown each year. In 2009, 109 math sections were offered through the three main terms. The program had grown to 133 sections for 2014 current school year. The great majority of the increase in number of sections is due to a larger need for developmental math sections but has also led to a smaller increase in the GE level math courses. While the number of sections we've offered has continued to go up the student/teacher ratio has not changed and we are holding steady at 21 to 23 students, on average, per

teacher in each section. This includes at least two on-line sections for Math 1010 and 1050 and several concurrent enrollment IVC courses.

The general advising of students attending Snow College is conducted through the Student Success Center. The Center employs many advisors who are trained to help with schedules, consult about major and career options, and find financial aid resources to pay for school. However, faculty members and part-time instructors in the math department often meet with students to discuss their current academic and/or performance needs as well as their future goals.

Data Form:

Faculty Headcount (Academic Year)	2010	2011	2012	2013	2014
With Doctoral Degrees					
Full-Time Tenured	2	2	2	2	2
Full-Time Non-Tenured	0	0	0	0	0
Part-Time	1	3	4	3	2
With Master's Degrees					
Full-Time Tenured	1	1	1	1	1
Full-Time Non-Tenured	5	7	7	8	7
Part-Time	5	4	3	5	5
With Bachelor's Degrees					
Full-Time Tenured	0	0	0	0	0
Full-Time Non-Tenured	0	0	0	0	0
Part-Time	3	5	4	4	8
Other					
Full-Time Tenured	0	0	0	0	0
Full-Time Non-Tenured	0	0	0	0	0
Part-Time	0	0	0	0	0
Total Headcount Faculty	17	22	21	23	20
Full-Time Tenured	3	3	3	3	3
Full-Time Non-Tenured	5	7	7	8	2
Part-Time	9	12	11	12	15
FTE					
Full Time	11.3	11.1	13.3	12.9	13.8
Teaching Assistants	NA	NA	NA	NA	NA
Part-Time	5.1	5.5	3.8	3.3	5.3
Total Faculty FTE (Academic Year)	16.40	16.60	17.10	16.20	19.10

Graduating Class	2010	2011	2012	2013	2014
Number of Graduates	3	4	2	0	2
Certificates	0	0	0	0	0
Associate Degrees	3	4	2	0	2
Bachelor's Degrees	NA	NA	NA	NA	NA
Master's Degrees	NA	NA	NA	NA	NA
Doctoral Degrees	NA	NA	NA	NA	NA
Number of Students (Academic Year)	2150	2342	2219	2208	2487
Total Declared Majors	68	63	57	55	67
Total Department FTE	358.33	390.33	369.83	368.00	414.50
Total Department SCH	10750	11710	11095	11040	12435
Student FTE/Faculty FTE	21.8	23.5	21.6	22.7	21.7

Cost (based on Fiscal Year-Cost Study)	FY10	FY11	FY12	FY13	FY14
Direct Institutional Expenditures	\$827,386	\$861,728	\$888,453	\$1,102,623	\$987,439
Cost per Student FTE	\$2,264	\$2,183	\$2,108	\$2,519	\$2,407
Funding:					
Appropriated Fund	NA	NA	NA	NA	NA
Other:					
Special Legislative Appropriation	NA	NA	NA	NA	NA
Grants of Contracts	NA	NA	NA	NA	NA
Special Fees/Differential Tuition	NA	NA	NA	NA	NA

Conclusion:

The Mathematics program at Snow College serves students well. We believe that real math people who can teach well always is a big help. We believe our small class sizes and the interactions that the students can have with real faculty is a huge plus. We think we could start using that as a recruiting pitch. Other schools tell you to get remediated on your own time or use some on-line thing which still leaves you all alone and then come work with them when you're really ready to go. We have not done that and don't anticipate doing that. We also want to start doing some integrated courses with our dev-math students and with some of our higher math courses, also. We believe we've had and still have wonderful opportunities for faculty development that helps improve our teaching skills and our math background.

Comprehensive Program Assessment:

In accordance with Utah State Board of Regents' policy R411 on the periodic review of educational programs, an on-site visit of Snow College's Mathematics program was conducted on April 24th 2015. This visit was preceded by careful study of the program's self-study document. The visit included a

comprehensive tour of educational facilities, conversations with students, class visits, and faculty interviews.

Program Strengths:

- Snow College mathematics faculty was commended for their credentials, enthusiasm, and loyalty, which was expressed by their sincere desire for students to learn and succeed in math. This includes the commitment of the mathematics department chair to attend regular state meetings and contribute to new and valuable changes to Snow College's Math Pathways.
- Snow College was commended for taking the lead in developing Pathways in accordance to the USHE Math 1010 mandate. Successfully renumbering the pathways correlating to the corresponding secondary school course. The math department design is being seriously considered at several other USHE institutions as THE statewide pathways curriculum. The guide is made accessible and understandable to all. The Pathways flyer contains information that guides students through the complex structure of registration. It's clean, concise, and easy to follow. On the flip side is a guide for high school students interested in taking concurrent enrollment course with the new USHE recommendations for high school preparation.
- The mathematics department is commended for their awareness of the money constraints on students. Adoption of textbooks that would meet the needs of the faculty while keeping costs low for students, has led to the use of the ILearn mathematics program, which is designed for students success at the lowest level of mathematics. From the use of this program, students are able to cut their time regarding completing developmental math courses, which saves them time and money. The outcome has also benefited the students as they progress to college level mathematics.
- The mathematics department has been highly commended for their concern with student population in developmental math courses. Having the focus on small class sizes supports the research that success in a developmental math course directly correlates to small (Less than 25) class size. Through the vision and dedication of the math department chair and the support of the faculty that they have this successful pass rate.
- Snow College is commended for their regional math contest which has seen growth, beyond its regional borders for the past 40 years. The goal for the competition, is an annual mathematics contest open to junior and high school students, is to provide a challenging, engaging mathematical experience that is both competitive and educational. Students are awarded a variety of prizes and scholarships, while also sparking an interest in mathematics.
- The Snow College department chair has been commended on the developing collegiality amongst faculty, given that they are spread all over campus. The chair holds regular bi-monthly meetings, and encourages attendance at the division seminars and school-wide lunch-brunch. Consequently, faculty member are strongly supportive of one another, genuinely care for each other, and focused on a common goal of providing high-quality instruction under trying circumstances, which we will refer later.

- Snow College is commended on the handling of the ongoing evaluation of adjuncts, including concurrent enrollment faculty. The department chair and campus faculty strive to make the adjunct faculty feel a part of the department. They provide a large office space and assistance in helping the development in their curricula. The adjunct and concurrent enrollment faculty is evaluated each semester and the concurrent enrollment faculty is mentored by the campus faculty. It is especially noteworthy to mention that all concurrent enrollment faculty are required to administer a common midterm and final, developed and graded by the Snow College Faculty.
- The mathematics department is commended for maintaining a dedicated math lab, and has a set of dedicated computers for students use. It is house in the Noyes building close to the adjunct offices and the department chair and other faculty. It is staffed by dedicated and qualified students. It appears that the department chair is willing to work with students schedules to allow the flexibility that a student needs to maintain a job on campus and still attend classes.

Program Weaknesses/Recommendations:

- **Adjunct Faculty Credentials:** Given the position statement from the American Mathematical Association of Two-Year Colleges for adjunct faculty to possess a minimum of a Master's degree in mathematics or mathematics education with a minimum of 18 credit hours of graduate level mathematics to teach a college level mathematics course (i.e. Math 1030 or higher), the challenge for Snow College to find such qualified adjunct instructors is acknowledged. However, to maintain the quality and rigor of such courses, it is recommended that the program should strive to hire adjunct instructions in accord with AMATYC's statement.
- **Bi-Annual Faculty Evaluations:** Although it is a policy to hold a bi-annual Adjunct faculty and concurrent enrollment faculty evaluation, given the time constraints of each faculty member it was evident that this wasn't taking place in a timely manner. It is critical that adjunct faculty feel a part of the campus team, and that the teaching of the campus courses are in line with the vision of the math department. It is recommended that the use of the concurrent enrollment money could be used to pay for a 1-credit hour reduction in a faculty member's workload in order to more effectively mentor high school adjunct math faculty members, grade concurrent enrollment math midterm and final exams, and input such grades into canvas with subsequent verification.
- **Location of Faculty and Program Chair Workload:** It is of some concern that the math department faculty offices are spread throughout campus. It is also very concerning that there is very little support or reduced load for the mathematics department chair. The regular duties of the chair are: scheduling of faculty, ordering of supplies, staffing and evaluation of concurrent enrollment teachers, staffing and guidance of the math lab, as well as the other time-consuming duties of a chair. It is a concern that the administration does not recognize the importance of the department chair's additional role as the "face" of the math department, and that he/she is not accessible to the students. It is even more concerning that there is very little administrative assistance to help with the duties or even co-chairs within the department. It is recommended that the chair be given increased reduction in workload. If she is required to continue to her 10-credit load, then additional support in the form of a co-chair needs to be instituted, with co-chairs also

given reduced teaching load. It is imperative that the chair is available for advising.

- **Mathematics Advising:** Serious concerns were evident and raised by faculty regarding advising. Although the new Pathways document helps alleviate some of those concerns, it is still apparent that students who are transferring to a university to complete a bachelor's degree need to have an adviser well versed in mathematics, mathematics education degrees, and actuarial certificates offerings across the state—all of which are lacking in the Pathways document, which wasn't designed for specialized advising. Central advising is insufficient in the knowledge that is required for not only math majors, but also for articulation agreements and specialized course that will help well prepared students transfer seamlessly in order to complete a bachelor's degree in a timely manner. It is recommended that a designated faculty member be assigned to counsel students with posted daily advising hours. Most of the specialized advising can only be done by someone who understands the different institutions, their degree requirements, and can recommend a course schedule.
- **Teacher Training, Professional Development, (observations) and Instructional Support.** While it is clear that the department members support each other informally, there appears to be little to no formal support in the form of teacher training, mentoring, and best practice sharing. It is recommended that the department establish a mentoring program that would benefit both new faculty member as well as established faculty members. It is also recommended a more formal sharing of best practices (i.e. teaching seminars, pedagogy sharing) within the department. This is a particularly important for a department that has so many adjuncts and concurrent enrollment teachers.
- **Campus wide scheduling of classes.** It is some concern that students are not able to access classes in a timely manner because there is no collaboration or coordination campus wide when it comes to course scheduling. It is recommended to collaborate and communicate regularly with the registrar in order to assure that classes are not scheduled in a way that prevents registration in other necessary courses.

Institutional Response:

- **Adjunct Faculty Credentials:** The reviewers referenced the AMATYC document and reminded us that any math faculty teaching at the 1030 or higher level should have a Master's degree (which is 100% true for us), but they still had concerns that we have a lot of adjuncts with a bachelor's degree and some concurrent enrollment teachers with a Level 4 teaching certificate instead of a Master's degree. The mathematics department shares this concern and will work to increase our oversight of the math concurrent classes. We have already talked about some of this and plan to have better information for the concurrent teachers, as well as ourselves, about the specific courses either on a website or in a Canvas class for the math faculty.
- **Bi-Annual Faculty Evaluations:** The chair will initiate a plan starting fall 2015 to visit each adjunct faculty member at least once and follow up with an office visit. We also started a plan last year to visit each concurrent faculty member, spreading that load among all full-time math faculty.

We will talk in August about improving this next year.

- **Location of Faculty and Program Chair Workload:** A review of the responsibilities of Deans and Department Chairs at Snow College occurred among the Academic Dean's Council and Faculty Senate during the 2014-2015 academic year. Among the results of this review (and subsequent document) is more work release for department chairs of programs with a substantial amount of full-time and adjunct faculty. In addition, the mathematics department chair is currently seeking office space solutions with the Division Dean and Vice President of Academic Affairs that will mitigate the effects of faculty being housed in different buildings on campus. Currently there are two proposals: (1) math faculty move together and stay together in the new science building due for occupancy in two years, or (2) math faculty do not move into the new science building finding other ways to congregate offices, including converting student math lab space into faculty offices.
- **Mathematics Advising:** Currently there is a proposal that delegates a math faculty member to put together a website or database that will 1) track our majors and where they are in the program and when/where they plan to transfer; 2) provide the majors with current and at-hand information for transferring and articulation to state schools on the website. In addition, this faculty member will be charged to stay in contact with our in-state schools for current information as well as provide dedicated advising hours or appointment times for mathematics majors.
- **Teacher Training, Professional Development, (observations) and Instructional Support:** In the future we will have two monthly department meetings. The first will be dedicated to calendaring and talking about the big department goals/projects/plans/accomplishments. The second meeting will focus on faculty development (e.g. pedagogies, teaching best practices, etc.). We have already assigned mentors to our three new faculty (starting fall semester 2015) and will start having more formalized weekly "chats" among the faculty teaching common courses (i.e. the chair will facilitate discussions among 1050 and 1040 teachers so they can help one another).
- **Campus wide scheduling of classes:** The Science and Math Division has already worked through the years to make sure class times don't conflict with each other in the division; thus preventing a student from taking several necessary (and often hard) courses in one semester. This review has given us some good direction for the next few years and we look forward to helping our students have even more success at Snow College.