

# Mathematics Program

## School of Arts & Science, University of Alaska Southeast

### 2013-14 Annual Report on Assessment of Student Learning Outcomes

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**Goals/Objectives:** The goals/objectives and methods of assessment for the Mathematics program in general, and the major and minor specifically are detailed in the revised (May 8, 2013) *Mathematics Program Assessment Plan*, posted on the Provost's website.

**Data Collection and Analysis:** Institutional data was requested for this annual report, but was not received. Jill Dumesnil gathered numerical data using QADHOC and researched those students of "unknown" status (see below). Additional findings for this report are based on observations made in the Mathematics Senior Seminar or other relevant courses and by way of *ongoing yearlong discussions* among, and feedback from program faculty at the three campuses.

#### Key Findings and Measures (2013-14):

- In AY 2014, Banner gives 19 mathematics majors. Each of these majors is categorized as Active New or Active Continuing, Grad 13, Grad 14, or COM or Left UAS; see definitions below. Many of the math majors listed in Banner have met with the math program coordinator, but some have not. In these meetings, the program coordinator assigns the student to a math faculty advisor, which generally seems to be an indicator of success for completing the degree.

	Total 2013	Total 2014	Active New	Active Continuing	Grad 13	COM or Left UAS	Grad 14
# of Majors	24	19	6	9+4 grads = 13	3	8	4

Note that the total number of majors in AY 2013 can be obtained by summing students with a status of "Active Continuing", "Grad 13", and "COM or Left UAS". The total number of majors in AY 2014 can be obtained by summing "Active New" and "Active Continuing" students. The "Grad 14" category is a subset of the total number of majors in 2014.

For the purposes of this table, the following definitions were used to indicate the status of a student who has declared a math major:

**Active** status indicates a major who was enrolled in at least one course at UAS (not necessarily a math course) during AY 2014.

**Active new** status indicates those active students who were either not enrolled in any course at UAS in AY 2013 or were not declared as a math major in 2013, but were listed as a math major and were enrolled in at least one course at UAS in AY 2014.

**Active continuing** status indicates those active students who are not "new".

**Grad 14** status indicates majors that graduated in Fall 2013 or Spring 2014. These graduates also have "active continuing" status.

**Grad 13** status indicates majors that graduated in Fall 2012 or Spring 2013.

**COM or Left UAS** status indicates majors that were "active" in AY 2013, but were not active in AY 2014 and did not graduate in AY 2013. Subcategories of this status include math

majors that 1) changed their major, 2) transferred to another MAU (UAA or UAF), or 3) transferred to a non-UA institution or are no longer pursuing a degree at any institution, for whatever reason.

Notes: An “active” major includes those students who are no longer pursuing a math degree, but have not changed their major. “New” students may have declared a math major previously, but delayed graduation or left UAS on a student exchange for AY 2013, so they are not technically new to the math program.

- The paper resulting from the Summer 2013 NREUP (National Research Experience for Undergraduates Program conducted by Andrzej Piotrowski), entitled *Non-Real Zero Decreasing Operators Related to Orthogonal Polynomials*, by Andre Bunton, Niki Jacobs, Samantha Jenkins, Charles McKenry Jr., Andrzej Piotrowski, and Louis Scott was accepted for publication in the journal *Involve*.
- Junior math major Andre Bunton traveled to Portland, OR in August 2014 and gave a presentation on his favorite part of the NREUP paper: *Simultaneous Generation of a Basis B and a Corresponding B-CZDS*. Partial funding for Andre came from Pi Mu Epsilon, the National Honor Society of mathematics recently installed at UAS. Andre received an award for his presentation at the conference.
- Senior math major Louis Scott chose to do his senior capstone extending ideas from the NREUP and did a very impressive job. Louis shared the “Ron Seater Math Award” for AY 2013-14 with senior math major Niki Jacobs, who also received the “Outstanding Student Award” in Spring 2014.
- During her senior year, Niki Jacobs initiated the application process for UAS to have a chapter (the first, and only in Alaska) of the mathematical National Honor Society, Pi Mu Epsilon. On April 17, 2014 Colin Starr of Willamette University installed the chapter and inducted the first UAS members of the honor society. Charter members inducted into Pi Mu Epsilon’s Alaska Alpha Chapter included Niki Jacobs, Patty Gerdes, Matt Sperber, Andre Bunton, Louis Scott, and Jill Dumesnil. Non-charter members included Megan Buzby, Andrzej Piotrowski, and Derek Eby. Following the induction ceremony, Colin gave a public talk in the Egan Lecture Hall on *The Nine-point Circle and Feuerbach’s Theorem*.

[Pi Mu Epsilon](#) is the National Honor Society of mathematics, and provides opportunities and support to undergraduate students in mathematics. Funding from this organization allowed Andre Bunton to present on behalf of the NREUP cohort at the 2014 Mathfest in Portland, Oregon. (See note above.)

- Niki Jacobs received a URECA award for her project: *Depiction of fractals through art* in AY 2013-14. The intention of the project was to generate an appreciation for mathematics and its applications at UAS. She accomplished this by using her award to screen print stunning fractal images on t-shirts and on learning center vests.
- Niki Jacobs is currently pursuing a graduate degree in Biomathematics at UAF. Samantha Jenkins is pursuing her masters in teaching at UAS in the MAT program. David Leonard was a math minor at UAS and is now pursuing a graduate degree in Statistics at UAF. Patty Gerdes is working in the UAS Testing and Learning Center as a Mathematics Specialist.
- The accomplishments of our majors and their post-graduate pursuits indicate the mathematics program is producing the desired results, providing mathematics majors valuable experiences and a competitive edge when applying for employment or admission to graduate programs.

- Enrollment figures for the MATH 106: *Concepts and Contemporary Applications of Mathematics* (after the withdrawal date) are given in the table below. The course was reinstated in Fall 2012 as an additional GER option for some majors. So far, the course seems to be a good option for some students. As an experiment, MATH 106 will only be offered via distance by Sitka or Ketchikan beginning Fall 2014.

<b>MATH 106</b>	Fall 2012	Spring 2013	Fall 2013	Spring 2014
Juneau	5	11	14	6
Ketchikan	--	--	4	
Sitka	--	7	--	9

- STAT 107: *Survey of Statistics* has been offered exclusively via distance delivery as of Spring 2013 through the Sitka campus. The rationale for this change was to increase average enrollments; the local Juneau campus course typically had very low enrollments for a lower-division course. Enrollments after the withdrawal date since Spring 2013 are given in the table below and indicate that UAS is continuing to meet the needs of these students with the current structure.

<b>STAT 107</b>	Spring 2013	Fall 2013	Spring 2014
Sitka	17	12	15

- Enrollments for lower-level mathematics courses after the withdrawal dates in Summer 2013 and Summer 14 (to catch up from Summer 2013 not included in last Assessment Report) are given in the table below.

		<b>MATH 054</b>	<b>MATH 055</b>	<b>MATH 105</b>	<b>MATH 107</b>	<b>MATH 108</b>	<b>STAT 107</b>	<b>STAT 273</b>
<b>Summer 13 Average</b>	J	--	--	11	--	--	--	--
	K	--	--	--	--	--	--	--
	T	8	13	28	16	--	7	30
<b>Summer 14 Average</b>	J	--	--	6	--	4	--	--
	K	--	--	--	--	--	--	--
	T	3	17	33	20	--	7	25

Summer offerings seem to be adequate with higher enrollments in MATH 105 and STAT 273, noting that some sections have been canceled for low enrollment. Note that distance courses with more than 30 students are offered as two sections, but listed as one course in Banner. To find the average, these sections were counted

- Average enrollments after the withdraw date for other lower-level MATH/STAT courses for the Fall 2013 and Spring 2014 semesters at the three campuses are given below. Sitka enrollment figures do not include courses taught at the Petersburg and Wrangell high schools.

		MATH 054	MATH 055	MATH 105	MATH 106	MATH 107	MATH 108	STAT 107	STAT 273
Fall 13 Average	J	36	20	19	14	24	26	--	24
	K	10	12	10	4	7	3	--	28
	T	12	25	22	--	12	4	12	2
Spring 14 Average	J	20	16	23	6	27	25	--	16
	K	--	11	20	--	7	4	--	--
	T	13	19	5	9	16	--	15	28
AY Ave.	J	28	18	21	10	26	26	--	20
	K	10	12	15	2	7	4	--	14
	T	13	44	19	5	14	2	14	15

- Enrollments in MATH S205/206 during Fall 2013 academic year were 10 and 10, respectively. To date, no concerns about the courses have been received by the mathematics program. This course continues to be taught by a School of Education faculty member.
- For the third year, the summer Math Refresher for New Students was offered in August 2013. Eight students attended the refresher and retook the Accuplacer placement exam after the two-week intensive. Five of those (62.5%) placed into Math 105 after the refresher course. All of those placing into Math 105 took Math 105 in the Fall of 2013, and four earned a grade of C or better. The remaining student who placed into Math 105 and took it earned a grade of D. The three other Refresher students placed into Math 055. One completed Math 055 with an A grade and progressed to Math 107 in Spring 2014. Ultimately, four of the students (50%) had completed their math GER course by the end of Spring 2014. Of the other four students: one never enrolled at UAS, one dropped Math 055 in Fall of 2013 and hasn't taken any other math course, one made D's in Math 105 in both Fall 2013 and Spring 2014, and one transferred to UAA and is taking Math 107 in the Fall of 2014.

Again the sample is small, but it appears that the students benefit by having intensive review with a dedicated faculty member. The Math Refresher transitioned to being offered by the Learning Center staff in the summer of 2014. The justification for this change is that the students will benefit more from establishing a relationship with the Learning Center staff than with the Associate Dean of Arts and Sciences (who had been teaching the Refresher).

- The Juneau math faculty continue to conduct the Annual JDHS/TMHS Calculus Camp in April. This activity is used, to a certain degree, as a recruitment tool for new mathematics majors.

**Proposed Program Changes/Measures Based on Assessment Results:** Actions worth mentioning include:

- UAS and UAA both utilize the Accuplacer Math Placement exam while UAF is researching alternative computer-based placement methods with the ALEKS program. In April 2014, the

Board of Regents passed a resolution to standardize lower level courses (including course titles, numbers, and descriptions) as well as placement exam policies across all three campuses. Discussions are in-progress to respond to this.

- Student Learning Outcomes have been provided for all 100 and 200 level mathematics and statistics courses as required by Dean Sousa in Spring 2014. Student Learning Outcomes are currently being composed for the remaining courses offered by the Math Program. It should be noted that the Math Program is not in agreement on the necessity or use of such a list. The major concern being that courses may become more robotic and procedural without allowing for true conceptual understanding of a particular topic.

**Assessment Plan Changes Based on Assessment Results:** The program's educational philosophy and guidelines for remedial, developmental and G.E.R. courses have been discussed regularly during the academic year. However, to date, specific changes have not been adopted.