

Program Review 2011 Evaluation Form

Program Information

Program Name *i.e. Anthropology Mathematics and Statistics (DMS)

College /School Name *i.e. CLA CNSM

Degree *Please choose one from the list. (Cert., AAS, BA, BS, MA, MS etc.)
Mathematics-M.S. & Mathematics M.A.T.

PART I - To be completed by the Faculty Program Review Committee

1. Quality and Assessment of the Program

Quality of the program, as determined by the establishment and regular assessment of program outcomes. Outcomes should be comprehensive, and indications of achievement should involve multiple measures and satisfy the properties of good evidence.

Please check all that applies to the Quality and Assessment of the Program.

- ☐ Separate plan for each program level e.g. Cert., AA/AAS, BS, BA, BBA, MS, MA, PhD
- ☒ Multiple (at least two) measures of student outcomes
- ☒ Plan has direct evidence of student learning not just surveys
- ☒ Assessment information is collected and summarized regularly
- ☒ Assessment summary is based on aggregate student information
- ☐ Assessment process has resulted in curricular improvement
- ☒ All elements recorded in the assessment plan are addressed in the assessment summary.

What is the evidence that students are achieving intended learning outcomes?

Evidence of student learning according to the Assessment Plan:

M.A., M.A.T. & PhD. Mathematics- Written and Oral Comprehensive Exams in Mathematics, Research project or Thesis evaluations, Exit & Alumni Surveys, Transcript Checks of recent graduates, Comparison of curriculum every three years with other programs at University of Washington, University of Wyoming and University of North Dakota.

Evidence of student learning presented in the Assessment Summary:

Report has narrative on the results of the evidence listed above.

Committee's assessment and guidance on Quality and Assessment of the Program:
Mathematics M.S., M.A.T. and PhD. programs share same assessment plan. SLOA plans should be separated.

The program's assessment process appears planned and has an implementation schedule. Curricular changes do not appear to be addressed though the narrative suggests changes may be made. Overall, the program, through their assessment, is stated to be functioning well.

Assessment Summary not in standard tabular format; included in report as a narrative. It appears that alumni survey is often not returned so information from these may be problematic in that the sample is too small or non-existent for genuine assessment and improvement of program.

Committee recommends survey method improves or another method of assessment explored and to separate assessment plans for the different degrees.

2. Demand for Program Services

Demand for program services, as indicated by measures such as: credit hour production appropriate to the program's mission, services performed by the program in support of other programs, graduates produced, the prospective market for graduates, expressed need by clientele in the service area, documented needs of the state and/or nation for specific knowledge, data, or analysis, other documented needed.

Committee's assessment and guidance on Demand for Program Services:

Report: The U.S. Department of Labor's Bureau of Labor and Statistics provides an Occupational Outlook Handbook (see <http://www.bls.gov/oco/>). In this handbook, Mathematicians, Actuaries, and Operations Research Analysts are described as occupations with much faster than average growth.

According to this AK Dept of Labor's website on the Alaska Occupational Forecast to 2018, Middle School Teachers, Post Secondary Teachers, and Secondary Teachers are three of the 23 so called "Top Jobs" that require bachelor's degrees or above. All mathematics teachers in these categories will require at least a bachelor's degree in mathematics. Post Secondary teachers require additional graduate study. 6 more of the top 23 are jobs in engineering and science which require significant mathematical study at the university level.

Number of majors (duplicated) in **Mathematics M.A.T.** in last five years (FY2006-FY2010): **3**

Number of graduates in **Mathematics M.A.T.** in last five years (FY2006-FY2010): **2**

Number of majors in **Mathematics M.S.** in last five years (FY2006-FY2010): **62**

Number of graduates in **Mathematics M.S.** in last five years (FY2006-FY2010): **9**

Total number of Mathematics & Statistic Degrees, all levels: 66

Evaluation: Math M.S. Program in steady demand with steady number of students, majors and graduates.

M.A.T. program had 3 majors and 2 graduates in the past five years. It is recommended that department review program for ways to improve numbers for viability of the Math M.A.T. degree or discontinue the program.

DMS provides extraordinary service coursework for other majors within the college and outside the college. Report: The ratio of credit hours produced by students with majors outside versus inside DMS is on the order of 10 to 1.

DMS Service teaching

Enrollee's major:	FY06	FY07	FY08	FY09	FY10
In department	743	648	583	633	587
In unit, outside department	1348	1353	1322	1416	1324
Outside unit	5950	5398	5279	4755	4992

3. Program Productivity and Efficiency

Program productivity and efficiency as indicated by courses, student credit hours, sponsored proposals and service achievements produced in comparison to the number of faculty and staff and the costs of program support (The latter may not be available or may be a combined cost for several programs).

Teaching:

Departmental FTEs by job class

Job class	FY06	FY07	FY08	FY09	FY10
Adjunct FTEs	1.53	1.4	1.35	1.58	2.48
Faculty FTEs	9.91	11.36	11.31	10.7	11.33
Staff FTEs	2.02	.93	.93	1.	1.
Student FTEs	4.21	5.39	5.14	4.67	3.02

Student credit hours, by subject and level

Subject and level	FY06	FY07	FY08	FY09	FY10
MATH - Lower	5459	4811	4557	4363	4539
MATH - Upper	965	781	908	849	796
MATH -Grad	177	221	194	167	106
MATH -Outside	2207	2545	3015	2913	3605
MATH -Prof		240	96	116	124

Degrees awarded

Degree and major:	FY06	FY07	FY08	FY09	FY10
MAT Mathematics			1	1	
MS Mathematics	1	3		5	

Student numbers and degrees awarded are very low in the MAT. MS appears viable, but could improve numbers of majors and graduates.

Research, Scholarly and Creative Activity:

On the Program Review Google Docs website for *Publications* in FY08-FY10:

DMS had listed 4 grants (2 grants in FY08 and 2 grants in FY10) with approximate total of \$830K.

In the Math and Stat Program Review there were 19 publications listed for 2007-2008.

From the Math and Stat report: research accomplishments of DMS faculty -over three-quarters of the faculty (11 of 14) obtained substantial external funding at some point over the last five academic years.

Did the program review include significant public, university and professional service achievements?

- ☒ Yes
- ☐ No

Committee's assessment and guidance on Program Productivity and Efficiency:

Service: Consulting seminars for graduate students in Statistics, Biology, Fisheries and Wildlife Biology and Alaska teachers in a research-based Alaska-specific mathematics curriculum called Math in a Cultural Context Curriculum.

DMS program has steady SCH and strong Service Teaching accomplishments and faculty appeared to be productive at teaching, research and service.

4. Program Duplication

Unnecessary program duplication resulting from the existence of a similar program or programs elsewhere in the UA statewide system (BOR policy). Academic programs offered by UAA are available online at <http://www.uaa.alaska.edu/academics/degrees/> and those offered by UAS are available at <http://www.uas.alaska.edu/academcis/alpha.html>

Committee's assessment and guidance on Program Duplication:

UAF offers the only M.S. and M.A.T. in Mathematics.

5. Centrality of the Program

Centrality of the program to the mission, needs and purposes of the university and the unit.

Committee's assessment and guidance on Centrality of the Program:

As a land-, sea- and space grant institution, Mathematics and Statistics are a necessary and integral program at the undergraduate and graduate level.

Mathematics and Statistics supports the Strategic Plans and the 2017 Vision Statement.

6. Timeliness

Timeliness of an action to augment, reduce or discontinue the program. [Address current internal or external factors that provide an opportunity for change, i.e. availability of new grant funding, increasing employment opportunities of graduates, or the departure of a significant portion of the faculty.]

Committee's assessment and guidance on Timeliness:

In the Dept. of Mathematics and Statistics (DMS) report a 2006 external program review stated two high priority items:

- 1) increased space and
- 2) increased faculty.

For example: in Fall 2009 and Spring 2010, nearly 60 % of their classes were taught by adjuncts.

From report: DMS would benefit greatly from having a larger number of graduate students, but need additional TA-ships for that to be possible.

7. Cost of the Program

Cost of the program relative to the cost of comparable programs or to revenue produced (BOR policy). Because we are not currently able to provide program specific budget information or the cost of comparable programs, assessment will be based on proportionate cost.

Committee's assessment and guidance on the Cost of the Program:

Note: No information on the cost of programs was made available to this committee.

8. Partnerships

Program described successful partnerships resulting in scholarships, equipment or in-kind services during the past three years.

Committee's assessment and guidance on Partnerships:

DMS reported on partnerships within UAF (ARSC, IAB, Geophysical Institute) and association with TASK program for travel and continuing education aid.

Committee suggests DMS explore further partnerships outside the institution.

RECOMMENDATION by the Faculty Program Review Committee: Please check one

- ☒ Continue program
- ☐ Discontinue program

Additional instructions for continuing program (if any): Please check applicable boxes

- ☒ Continue program but improve assessment process and reporting
- ☒ Continue program but improve other specific areas

Comments (majority/minority statements welcome):

Assessment Summary not in standard tabular format; included in report as a narrative. It appears that alumni survey is often not returned so information from these may be problematic in that the sample is too small or non-existent for genuine assessment and improvement of program.

Committee recommends survey method improves or another method of assessment explored and to separate assessment plans for the different degrees.

Mathematics M.S., M.A.T. and PhD. programs share same assessment plan. SLOA plans should be separated.

It is recommended that department review program for ways to improve numbers for viability of the Math M.A.T. degree or discontinue the program.

Vote Count Please record the vote majority/minority: Votes to continue program and follow additional instructions; 8 Yes, 0 No, 0 Abstain

PART II - To be completed by the Administrative Program Review Committee

RECOMMENDATION by the Administrative Program Review Committee:

- ☒ Continue program MS Vote: 11 MAT Vote: 7
- ☒ Discontinue program MS Vote: 0 MAT Vote: 5

Additional instructions for continuing program: Please check applicable boxes.

- ☒ Continue program but improve assessment process and reporting MS Vote: 11 MAT Vote: 6
- ☐ Continue program but improve other specific areas MS Vote: 1 MAT Vote: 2

Comments:

MS: How the SLOA differs from that for other Mathematics graduate programs needs to be defined. A SLOA separate and different from that for the other Mathematics graduate programs is essential. Metrics for "national standards" are not given. The SLOA needs to be improved. The number of graduates is sufficiently healthy (9 graduates during the 2006-2010 period).

MAT: The SLOA is the same as that for the other Mathematics graduate programs. A SLOA separate and different from that for the other Mathematics graduate programs is essential. The program had only 2 graduates during 2006-2010. The demand for the program should be assessed. If the enrollment doesn't reflect the demand, a plan should be developed and implemented to raise program enrollment and the number of graduates. CSNM and SOE should work on stronger integration or eliminate.

PART III- To be completed by the provost in consultation with the Chancellor's Cabinet

RECOMMENDATION on MS by the provost and Chancellor's Cabinet:

- ☒ Continue program
- ☒ Discontinue program

Additional instructions for continuing program: Please check applicable boxes

- ☒ Continue program but improve assessment process and reporting
- ☐ Continue program but improve other specific areas

RECOMMENDATION on MAT by the provost and Chancellor's Cabinet:

- Continue program
- Discontinue program

Comments:

UAF offers the only mathematics graduate degrees in the state of Alaska. (UAS offers a M.Ed. in Mathematics Education). Some UAF Master's graduates (whether MS or MAT) secure teaching positions after graduation, either for grades 7-12 or at the community college or university level. Some secure jobs requiring mathematical skills, e.g., analyst or research assistant. Others enroll in doctoral programs.

The Mathematics MS/MAT have a mostly satisfactory assessment plan that has been partly implemented. If the MAT and Ph.D. degrees are retained, each should have an assessment plan and outcomes report separate from that of the MS degree. (There can be overlap, but the learning outcomes of different degrees must differ to some extent...else why offer more than one degree?) The assessment plan includes review of the curriculum relative to that of peer institutions. While this is appropriate as a control on program quality, it is not a measure of student learning outcomes. The results of the comprehensive examination are a good assessment tool, and as more examinations are collected and examined, any needed improvements to curriculum and instruction can be identified. Alumni surveys were distributed but the return rate was very low, a common problem. A student exit survey generally has better yield although it may not provide all of the desired information. Surveys in general often turn out to yield little information on learning outcomes. An additional means of direct assessment that many graduate programs use is an evaluation of the thesis or project defense, done by the advisory committee.

NWCCU assessment standards require regular collection of assessment data specified in the assessment plan, regular review of that data by the faculty, and implementation of indicated curricular or instructional changes. All of these facets of assessment must be evident in subsequent assessment reports.

The mathematics faculty are productive in publication and most secure external research funding, often in interdisciplinary collaborations. RAs are not usually available to Master's students; some receive teaching assistantships. The faculty have been active in regional and national level public and professional service activities.

There has been an average of about 13 Mathematics MS majors for the past five years. Graduates averaged about 1.8/year, for a graduate/major ratio of 0.14. The ratio would be consistent with a 40% completion rate if students took an average of three years to complete or a 70% rate if completion time is five years, more likely if some students are attending part-time. This is a lower production of graduates than most UAF Master's programs, but due to the small numbers this could be due to random events that led to a few students not completing. All programs should monitor student persistence, attrition, and time to completion to see if there are ways to improve student success without negative impacts on learning outcomes.

There has been only one MAT student enrolled and two degrees awarded in the past five years. This degree differs from the MS mainly in having more course credits required, but not requiring a thesis or project. Although the MAT does not add costs to the MS program, there seems to be almost no demand for it and the cabinet level recommendation is to eliminate it.

The Mathematics MS has a small enrollment, especially given that the total enrollment of all Mathematics graduate programs is only a few students more. Graduate courses enroll a few students from other fields, but the enrollment is typically five students or less. On the positive side, however, this program is the only in-state source of college level mathematics instructors and indeed many of the current Math and DEVM instructors within UA are graduates, as well as being a source of high school math teachers. Therefore, in the current fiscal climate its benefits outweigh its costs.