

# Program Review 2011 Evaluation Form

## Program Information

Program Name \*i.e. Anthropology      Mathematics  
College /School Name \*i.e. CLA      CNSM, Mathematics and Statistics (DMS)  
Degree \*Please choose one from the list. (Cert., AAS, BA, BS, MA, MS etc.) PhD.

## 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:

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.

## 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.

From DMS report: UAF is the only place a student in Alaska can pursue a graduate degree in mathematics or statistics, it is the only place graduate students in other areas (engineering, biology, geophysics, etc) have access to the graduate-level math and statistics courses integral to their degrees.

Number of majors in **Mathematics PhD**, in last five years (FY2006-FY2010): **17 (including duplicates)**. Between 2 to 7 in each year.

Number of graduates in **Mathematics PhD**, in last five years (FY2006-FY2010): **2**

Evaluation: Program shows reasonable demand with their number of majors yet relatively low number of graduates. DMS reported that the 2 PhD graduates in FY10 were the first PhD graduates in more than 20 years (listed in report, likely a typo: correct number is 10 years) and 2 more PhD students just began their study (in FY11?).

DMS provides service graduate coursework outside the department.

### 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
PHD Mathematics					2
Total # awards	13	16	11	13	13

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 appear to 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 Ph.D. in Mathematics in the UA system.

#### 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 the institution (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
- ☐ x 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.

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

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

With only 2 PhD. graduates in more than 20 years ((listed in report, based on information of committee member likely a typo: correct number is 10 years) DMS should investigate ways to increase this number or make clear the reasons for the continuation of this program.

The committee sees the following merits of the program:

- access to grants that are only for PhD programs
- publications from PhD students (although varies by student)

- helps recruiting MS students

The committee sees the following problems with the program:

- no unified support from the DMS department faculty
- low number of graduates
- low graduation rate

The program appears to have no strong support for student recruitment based on the report. In conclusion our committee recommends a thorough evaluation of this program both within the department and by the university with possible input from outside the institution.

We recommend this be done and completed in a timely manner.

Vote Count Please record the vote majority/minority:

Votes to continue program and follow additional instructions; 9 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 Voted: 4
- Discontinue program Voted: 8

Additional instructions for continuing program: Please check applicable boxes.

- ☐ Continue program but improve assessment process and reporting Voted: 3
- ☐ Continue program but improve other specific areas Voted: 1

Comments:

Small program with just two grads in more than 20 years. Not duplicated by any other UA MAUs. The first objective in the student learning assessment, is not a learning assessment. Ensuring that the curriculum meets national standards is a laudable program review tool but is not a specific objective about students learning. The alumni survey is indirect leaving just 1 direct assessment measure. No evidence of how this one direct measure matches to outcomes. Overall, entire report very poorly written in that it combines all undergraduate and graduate Math programs and makes it difficult for the reviewer to sort out. If there are no different outcomes for a doctorate than a master's program, then the doctorate program should be eliminated.

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

RECOMMENDATION 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

Comments:

UAF offers the only mathematics Ph.D. degree in the state of Alaska.

The mathematics MS/MAT/Ph.D. have a mostly satisfactory assessment plan that has been partly implemented. If either 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. While the alumni survey is an acceptable component of an assessment plan, surveys often have low return rates and 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 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. The faculty have been active in regional and national level public and professional service activities.

There has been an average of only 3.4 Mathematics Ph.D. students for the past five years and a total of just two graduates over the five years. During the last program review (about 2006) the Mathematics Ph.D. was also found to have very low enrollment and graduates. Further, all of the Ph.D. students at that time, and both of the FY10 Ph.D. graduates, were advised by one faculty member, Dr. Sergei Avdonin.

The mathematics faculty is small and has a relatively heavy teaching load, compared with the other CNSM departments where most faculty have joint institute appointments. It's understandable that there is little interest among them in mentoring Ph.D. students, but if that is the case, then there is no need to keep the program.

The view of the cabinet is that resources currently invested in the Ph.D. program (although they are small) are probably better spent on increasing the enrollment in the M.S. program. Therefore the recommendation of chancellor's cabinet is to discontinue the program.