

**Degree/Certificate: Bachelor of Arts in Mathematics**

**Major/Option: BA including all options**

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### **Part I – Program SLO Assessment Report for 2013-14**

**Part I – for the 2013-14 academic year:** Because Deans have been asked to create College-Level Summary Reports annually, the template has been slightly modified for a) clarity for Chairs and Directors, and b) a closer fit with what the Deans and Associate Deans are being asked to report.

1. **Student Learning Outcome:** The student performance or learning objective as published either in the catalog or elsewhere in your department literature.

SLO # 1: Demonstrate the ability to create and understand mathematical arguments and proofs

2. **Overall evaluation of progress on outcome:** Indicate whether or not the SLO has been met, and if met, to what level.

*SLO is met after changes resulting from ongoing assessments, referencing assessment results from the previous year to highlight revisions;*

*SLO is met, but with changes forthcoming;*

*SLO met without change required*

3. **Strategies and methods:** Description of assessment method and choices, why they were used and how they were implemented.

**Course:**

Math 431: Modern algebra 1

**Assessment Question:**

The assessment question appeared on a final exam Fall 2013 and was worth 12 points on the exam (graded out of 100).

**Rubric Used on Exam:**

0-12 pts      Based on correctness of proofs and quality of explanations.

**Rubric Used for Assessing Goal:**

0-4            0-1 = Not meeting goal  
                 2-3= Minimally meeting goal  
                 4= Fully Meeting goal

Student	Exam Score/12	Total Score on Exam/100	Final Grade	Assessment Score
1.	11	70	3.0	4
2.	1.5	67	2.2	1
3.	7.5	61	2.0	2
4.	10	67	3.0	4
5.	11	66	3.0	4
6.	0.5	29	0.7	0
7.	2	53	2.8	1
8.	10.5	82	3.4	4
9.	7.5	96	3.2	2
10.	9	96	4.0	3
11.	0.5	42	2.0	0
12.	2.5	47	2.0	1
13.	8	100	4.0	3
14.	0.5	80	3.0	0
15.	10.5	50	2.0	4
16.	11	97	3.8	4

4. **Observations gathered from data:** Include findings and analyses based on the strategies and methods identified in item #3.
- a. Findings: 37.5% did not meet the SLO, 25% met the SLO minimally and 37.5% fully met the SLO.
  - b. Analysis of findings:  
Low scores 0,0,0,1,1,1 : All of these students tried as many problems on the final exam as they could, often writing down meaningless sentence fragments in the hope of gathering some partial credit. This strategy worked for three of these students

with final exam scores 80,67,67. Quite possibly these three students could have met the assessed SLO. The other three were not able to scrape enough from doing a lot of problems to get decent final results 47,42,29. They were unable to gather substantial partial credit on the assessed question due to their inability to present a logical argument.

Mid-range scores 2,2,3,3 : Two of these students seemed to have completed just enough of the assessment question to demonstrate understanding and thereby collect good partial credit and moved on to other questions. The other two students understood what was needed but had difficulty working with modular arithmetic. Also there were errors in presenting their results logically.

High scores 4,4,4,4,4,4 : These students understood the concept of a group and the procedures required to verify that a given set with an operation was a group. They were also comfortable with modular computations and understood the natures of the additive and multiplicative modular groups. They were able to present their results without any major logical errors.

Overall the students entering Math 431 were weaker than usual on prerequisite knowledge (Math 225). This was taken into account in the overall assessment and final grades. The class (two sections) started with 33 but 8 dropped out and 2 more did not take the final. This high drop out rate was probably due to their lack of knowledge of the Math 225, Foundations of Mathematics, content. It is extremely difficult for students to learn (for the first time and not just as refresher material) Math 225 content while taking Math 431.

**5. What program changes will be made based on the assessment results?**

- a) Describe plans to improve student learning based on assessment findings (e.g., course content, course sequencing, curriculum revision, learning environment or student advising).

To help students with our upper division courses the Foundations of Mathematics Math 225 is undergoing intensive revision. To help the students Math 431 will be changed to a 5 credit course. The added hour will focus on student participation. More student projects centered on applications of abstract theory will be assigned as such engagement will be extremely beneficial.

- b) Provide a broad timeline of how and when identified changes will be addressed in the upcoming year.

The changes mentioned above for Math 431 will go into effect the next academic year. The Math 225 revisions started last year and hopefully improvements will be apparent for some of the Math 431 students this year.

**6. Description of revisions to the assessment process the results suggest are needed and an evaluation of the assessment plan/process itself.**

SLOs will be revisited following a revision of the BA in Mathematics. Details will follow.

## NEW: PART II – CLOSING THE LOOP

### FOLLOW-UP FROM THE 2012-13 PROGRAM ASSESSMENT REPORT

In response to the university's accrediting body, the [Northwest Commission on Colleges and Universities](#), this section has been added. This should be viewed as a follow up to the previous year's findings. In other words, begin with findings from 2012-13, and then describe actions taken during 2013-14 to improve student learning along, provide a brief summary of findings, and describe possible next steps.

**Working definition for closing the loop:** *Using assessment results to improve student learning as well as pedagogical practices. This is an essential step in the continuous cycle of assessing student learning. It is the collaborative process through which programs use evidence of student learning to gauge the efficacy of collective educational practices, and to identify and implement strategies for improving student learning.* Adapted 8.21.13 from <http://www.hamline.edu/learning-outcomes/closing-loop.html>.

1. **Student Learning Outcome(s)** assessed for 2012-13
2. **Strategies implemented** during 2013-14 to improve student learning, based on findings of the 2012-13 assessment activities.
3. **Summary of results** (may include comparative data or narrative; description of changes made to curriculum, pedagogy, mode of delivery, etc.): Describe the effect of the changes towards improving student learning and/or the learning environment.
4. What **further changes to curriculum, pedagogy, mode of delivery**, etc. are projected based on closing-the-loop data, findings and analysis?