Academic Assessment Committee
CCSU
Central Connecticut State University

Submission Guidelines for INTERIM Assessment Reports (assessment results from AY 2015-16)

Guidelines:

1) *Submission deadline:* ***September 30, 2016,*** *early submissions are encouraged*
2) *Submit electronically to Yvonne Kirby (Director of OIRA) as an email attachment (ykirby@ccsu.edu)*
3) *Provide a SEPARATE REPORT for each academic program. All certificate and degree programs are required to be assessed per NEASC. Check the reporting calendar to see which certificate programs are considered embedded in a degree program as these programs do not need to be reported on separately.*
4) *An Interim report consists of the completed Overview report for the academic program and General Education Overview, if appropriate.*
    a. *If your department contributes to the General Education (GE) curriculum and has not conducted any assessment on GE but your faculty have contributed artifacts to the Multi-State Collaborative, please indicate which faculty have provided artifacts (item 7 in the GE report).*

Reminder: Assessment reporting is on a five-year cycle, consisting of a full report in year one followed by interim reports for three years and then a summary report is due in the fifth year. The assessment cycle is aligned with the Program Review Cycle such that the full assessment report is due the year prior to the year that the department will submit their program review report. Departments are not required to submit an assessment report for a program in the year the department is scheduled to begin writing the Program Review self-study (see Program Review Policy and Assessment Calendar). For example, if your program is scheduled for program review in Spring 2017 or Fall 2017 then only a Summary assessment report will be due for that program in Fall 2017 (report covering AY 2016-17 activities); this is necessary to comply with BOR requirements. Departments that are accredited by an outside agency, and thus exempt from the Program Review Policy, should follow the guidelines for assessment reporting as described in this document and follow the Assessment Calendar. Where possible, the assessment cycle will be aligned with the accreditation cycle and a Summary report will be due in the year the self-study is due to the accrediting body.

Interim reports: complete ONLY the Overview for the program, complete with contribution to general education.
URL to Assessment website resources: http://web.ccsu.edu/oira/assessment/assessment_aap.asp

Overview: **The following questions are required by the Connecticut State Colleges and University Board of Regents, NEASC and the CCSU Academic Assessment Committee. These questions must be completed annually for all academic programs as well as all departments offering courses in general education. Submit a separate table for each program and for each general education learning outcome the department teaches.**

- You are encouraged to address the questions using bullet statements rather than paragraph form —full details should be included within the text of the full report when it is due, not in the Overview.

- **Interim reports**: the Overview should append clearly labeled data tables as appropriate - for both the academic program as well as general education.

Overview

Department: Mathematical Sciences

Report Preparer: Shelly Jones, Phil Halloran, Marian Anton, and Yuanqian Chen

Program Name and Level: BA in Mathematics (Undergraduate)

Program Assessment Question	Response
URL: Provide the URL where the learning outcomes (LO) can be viewed.	http://www.ccsu.edu/mathematics/files/BA_ProgramLearningOutcomes.pdf
LO Changes: Identify any changes to the LO and briefly describe why they were changed (e.g., make LO more discrete, align LO with findings). If no changes were made, please report not applicable.	N/A
Strengths: What about your assessment process is working well?	1. Faculty report levels of performance for each student taking courses required by the program such as Math 151, Math 221, Math 218, Math 228, Math 366, Math 377, and Math 450. Students are therefore assessed throughout the program from freshman year to senior year. 2. Many professors contribute data to the assessment process. 3. We piloted a rubric for use in Math 450 the capstone course.
Improvements: What about your assessment process needs to improve? (a brief summary of changes to assessment plan can be reported here)	We feel the need to revise the learning objectives to better reflect the specializations within the program. Also we would like to look into using other instruments such as artifacts given the small numbers of students in the program. Some faculty requested more specific guidelines on assessing levels of performance. The department assessment committee will re-evaluate our student learning outcomes to assure they are reflected in all our specializations. We will discuss implementing common assessment items and/or a common rubric/guidelines to describe the current performance levels: (2) Strong Performance of the Learning Outcome; (1) – Acceptable Performance of the Learning Outcome; (0) – Does Not Meet the Learning Outcome. Professors will use the rubric/guideline to determine the extent to which the outcomes are met. We already have Course Learning Outcomes and these will be used to inform the creation of the rubrics.
For Each Learning Outcome (LO) complete questions 1, 2 and 3: Many programs have a large number of LOs, please limit the report to no more than five.	

LO 1. Understand basic analytic arguments using such common notions as epsilon/delta, infinite sums, and limits.	
1.1) **Assessment Instruments**: What is the source of the data/evidence, other than GPA, that is used to assess the stated outcomes? (e.g., capstone course, portfolio review and scoring rubric, licensure examination, etc.)	Faculty use a rubric to assess levels of performance for each student taking Calculus I - Math 152 and Calculus II - Math 221. Professors complete a Course Learning Outcome rubric for each student and they use these results to determine the level of performance for the associated Program Learning Outcome. The current performance levels are: (2) Strong Performance of the Learning Outcome; (1) – Acceptable Performance of the Learning Outcome; (0) – Does Not Meet the Learning Outcome. The Course Learning Outcomes for Math 152 are: · Compute and understand limits · Compute and understand derivatives · Solve application problems using derivatives The Course Learning Outcomes for Math 221 are: · Compute definite and indefinite integrals using varied techniques · Determine convergence of sequences and series · Apply integration to compute areas and volumes of revolution
1.2) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.).	The Mathematics Department ad hoc faculty Assessment Committee made up of professors who teach the courses and the Department Chair and/or one of the Department's Assistant Chairs
1.3) **Results**: Since the most recent full report, list: a. The conclusion(s) drawn b. The changes that were or will be made as a result of those conclusion(s)	Conclusion: We have reported by faculty N=307 students in the program taking Calculus I and Calculus II with the distribution N=14 students (BA students only), N=93 students (all students enrolled in those course sections reported), N=85 students, and N=115 students over the last 4 years. The number of students Not Meeting Expectations is 80/307 (26%). Overall 86/307 (28%) students Exceeded Expectations and 141/307 (46%) Met Expectations. The data show that in the first year of data collection with only BA majors, all students Met Expectations; however, in subsequent years we were encouraged to report on all students enrolled in the course because the head count for BA majors only in Math 152 was too small. The data show that in these subsequent years, about one fourth of the students reported on in Math 152 Did Not Meet Expectations. We hypothesize that the large number of students not meeting expectations is attributed to the fact that most students that take Math 152 are not BA majors. In Math 221, we found that 40% of the students in the last two years are not meeting LO1. This needs to be discussed further especially since the head count includes only a portion of the sections offered and all students were reported on rather than only the BA majors.

	Changes: We suggest revisiting the distribution of topics between math 152 and math 221 to improve the rate of success in math 221 which currently drops by 20% from that in math 152. The Math Department will need to decide whether or not we will continue to use Math 152 in our assessment of the BA program because the majority of students enrolled in sections of Math 152 are not BA majors. Most BA majors come in with Calculus I. The math department will continue to investigate and discuss the causes of the large number of DFW's in Math 152 (Calculus I). We have begun this process by researching the prerequisite courses and course grades of students who have enrolled in Math 152. In general, those students who achieved below a B (not a B-) in Calculus I did not fare well in either Calculus II or Discrete Mathematics. Currently the required grade in the prerequisite courses is B-. In addition, students who achieve less than a B (not B-) in the prerequisite courses for Math 152 (Calculus I), did not do well in Math 221. The Math Department will reconsider this requirement. In the future we may consider reporting only the BA majors.

LO 2. Understand basic algebraic and discrete notions, such as facts about vector spaces and counting arguments.	
2.1) **Assessment Instruments**: What is the source of the data/evidence, other than GPA, that is used to assess the stated outcomes? (e.g., capstone course, portfolio review, licensure examination, etc.)	Faculty use a rubric to assess levels of performance for each student taking Discrete Mathematics - Math 218 and Linear Algebra - Math 228. The Course Learning Outcomes for Math 218 are: Prove mathematical statements, Understand sets and functions (including properties and applications), Prove suitable mathematical statements by induction, Solve basic combinatorial problems. The Course Learning Outcomes for Math 228 are: Solve systems of linear equations, Perform computations involving matrices, Apply and verify linearity of transformations, and Understand and apply vector space definitions and properties. Professors use the Course Learning Outcomes as a rubric to determine their decision for how they rate students on the Degree Program Learning Outcome (LO2). Having Course Learning Outcomes make it more likely that professors will be on the same page when assessing the Degree Program Learning Outcome. They will all consider the same skills in making their decisions.
2.2) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.).	The Mathematics Department ad hoc faculty Assessment Committee made up of professors who teach the courses and the Department Chair and/or one of the Department's Assistant Chairs
	Conclusion:

2.3) Since the most recent full report, list: a. The conclusion(s) drawn b. The changes that were or will be made as a result of those conclusion(s)	We have reported by faculty N=205 students in the program taking Math 218 and Math 228. The number of students not meeting the expectations is 20/205 (10%). Overall 72/205 (35%) students Exceeded Expectations, and 113/205 (55%) students Met Expectations. In the higher level courses, Math 218 and 228, the students consistently performed better on LO2 than on LO1. Fewer students were at the level of Not Meeting Expectations.
	Changes: N/A
LO 3: Be able to follow and recreate algebraic proofs, with a good understanding of groups.	
3.1) **Assessment Instruments**: For each LO, what is the source of the data/evidence, other than GPA, that is used to assess the stated outcomes? (e.g., capstone course, portfolio review, licensure examination, etc.)	Faculty use a rubric to assess levels of performance for each student taking Math 366. The Course Learning Outcomes for Math 366 are students will: Understand and apply definitions of group, subgroup, Understand and apply definitions and properties of cyclic group, permutation group, factor group, and Understand and apply definitions and properties of homomorphism, isomorphism. Professors use the Course Learning Outcomes as a rubric to determine their decision for how they rate students on the Degree Program Learning Outcome. Having Course Learning Outcomes make it more likely that professors will be on the same page when assessing the Degree Program Learning Outcome. They will all consider the same skills in making their decisions.
3.2) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.).	The Mathematics Department ad hoc faculty Assessment Committee made up of professors who teach the courses and the Department Chair and/or one of the Department's Assistant Chairs
3.3) Since the most recent full report, list: a. The conclusion(s) drawn b. The changes that were or will be made as a result of those conclusion(s)	Conclusion: We have reported by faculty on N=90 students in the program taking Math 366. The number of students Not Meeting Expectations is 10/90 (11%). Overall 32/90 (36%) students Exceeded Expectations and 48/90 (53%) Met Expectations. The number of students in the BA program is relatively small, making data analysis less relevant in terms of percentages.
	Changes: N/A

LO 4. Be able to both follow and recreate analytic proofs, including basic ideas involving abstract metric spaces and differential equations.	
4.1) **Assessment Instruments**: For each LO, what is the source of the data/evidence, other than GPA, that is used to assess the stated outcomes? (e.g., capstone course, portfolio review, licensure examination, etc.)	Faculty use a rubric to assess levels of performance for each student taking Math 377. The Course Learning Outcomes for Math 377 are students will: Understand the topology of the real line, Rigorously determine/prove convergence of sequences, Rigorously determine/prove continuity and uniform continuity of functions, and Understand distinct types of convergence of sequences of functions. Professors use the Course Learning Outcomes as a rubric to determine their decision for how they rate students on the Degree Program Learning Outcome. Having Course Learning Outcomes make it more likely that professors will be on the same page when assessing the Degree Program Learning Outcome. They will all consider the same skills in making their decisions.
4.2) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.).	The Mathematics Department ad hoc faculty Assessment Committee made up of professors who teach the courses and the Department Chair and/or one of the Department's Assistant Chairs
4.3) Since the most recent full report, list: a. The conclusion(s) drawn b. The changes that were or will be made as a result of those conclusion(s)	Conclusion: We have data reported by faculty for N=65 students in the program taking Math 377 with the distribution (N=9, N=16, N=22, N=18) over the last 5 years (one year was missing data). The number of students not meeting the expectations is N=9 with the distribution (N=1, N=4, N=4, N=0). This distribution is approximately uniform hinting that the program is within normal parameters. Overall 20/65 students Exceeded Expectations, 36/65 Met Expectations, and 9/65 Did Not Meet Expectations. The number of students in the BA program is relatively small, making data analysis less relevant in terms of percentages. In the course Math 377, over the past three years reported, there were 25% (n=64), 18% (n=4), and 0% of students not meeting expectations. These percentages (number of students) not meeting expectations is anticipated because this is a difficult course.
	Changes: N/A
LO 5. Be able to independently investigate more advanced topics in mathematics and present their results to others in a clear way.	

5.1) **Assessment Instruments**: For each LO, what is the source of the data/evidence, other than GPA, that is used to assess the stated outcomes? (e.g., capstone course, portfolio review, licensure examination, etc.)	Faculty use a rubric to assess levels of performance for each student taking Math 450, a capstone course. LO5 is assessed at the end of a student's program in the course MATH 450 Seminar in Proof which is only offered in the Spring semester. To assess LO5: Be able to independently investigate more advanced topics in mathematics and present their results to others in a clear way, professors use two rubrics. One rubric is for a culminating written assignment and the other for a culminating oral presentation. Please see attached rubrics.
5.2) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.).	The Mathematics Department ad hoc faculty Assessment Committee made up of professors who teach the courses and the Department Chair and/or one of the Department's Assistant Chairs
5.3) Since the most recent full report, list: a. The conclusion(s) drawn b. The changes that were or will be made as a result of those conclusion(s)	Conclusion: This course is normally taken at the end of a student's BA program. Students taking this course are well prepared, as reflected by the results. Overall, the course objectives with the lowest results are the ones having to do with the motivation; some students who can explain the proof well have a harder time explaining why it is important. This is not surprising, because explaining the motivation requires doing some independent research about the topic, and students have had less experience with doing that than they have with writing correct and complete proofs. Note: The rubric used for this LO was piloted once in spring 2014. The spring 2015 professor did not grade for motivation because s/he did not ask students for their broader motivation for the proofs. We have reported data by faculty for N=42 students in the program taking math 450 with the distribution N=17 and N=25 over the last 2 years. The number of students not meeting the expectations is N=2. Overall 19/42 (45%) students Exceeded Expectations, 21/42 (50%) Met expectations, and 2/42 (5%) Did Not Meet Expectations. The number of students in the BA program is relatively small, making data analysis less relevant in terms of percentages.
	Changes: N/A

Interim reports: append clearly labeled supporting data tables, organized by LO

General Education Summary:

1. Summary only required for departments contributing to the General Education Curriculum.
2. If department contributes to more than one LO, complete one table for each LO.
3. If department has not conducted any assessment on GE but your faculty have contributed artifacts to the Multi-State Collaborative, please indicate which faculty have provided artifacts (item 7).
4. URL for the list of approved general education courses and LO/objectives: http://ccsu.smartcatalogiq.com/en/current/Undergraduate-Graduate-Catalog/Undergraduate-General-Education-Program

Department: Mathematical Sciences

General Education LO Assessed: To strengthen quantitative skills. Relevant outcomes include the ability to: apply mathematical and statistical techniques as a means of analysis within a variety of disciplines, and assess the strengths and weaknesses of these techniques of analysis.

Report Preparer: Data Collected however not analyzed

General Education Question	Response
1) **Courses**: General Education course(s) taught and the LO(s) the course aligns with	Math 105, Stat 104
2) **Assessment Instruments**: What data/evidence, other than GPA, is used to assess the stated CCSU General Education outcomes? (e.g., capstone course, portfolio review, licensure examination, etc.)	Faculty that teach General Education courses are sent a list of their students and asked to assess their students on the General Education Learning Outcome: Students will apply mathematical and statistical techniques as a means of analysis within a variety of disciplines, and assess the strengths and weaknesses of these techniques of analysis. Professors are asked to assess students using performance levels of Exceeds (2), Meets (1) and Does Not Meet (0). There is no rubric at this time.
3) **Interpretation**: Who interprets the evidence? (e.g., faculty, Admn. assistant, etc.). If this differs by LO, provide information by LO	Our department has not looked closely at General Education
4) **Results**: Since the most recent full report, list: a. The conclusion(s) drawn	Conclusion: n/a
	Changes:

b. The changes that were or will be made as a result of those conclusion(s)	n/a
5) **Strengths**: List ways in which your assessment process is working well.	Our department has not looked closely at General Education
6) **Improvements**: List ways in which your assessment process needs to improve (a brief summary of changes to assessment plan can be reported here).	Our department will participate in the Multi-State Collaborative. This will give the department incentive to take a closer look at general education. We are also considering using the AAC&U Rubric for Quantitative Literacy to assess the Learning Outcomes in selected General Education courses. These decisions must be made this fall 2016.
7) Our department has not assessed its contribution to the General Education curriculum but our faculty are contributing to the Multi-State Collaborative. Please list faculty names.	Shelly M. Jones Marian Anton

Interim reports: append clearly labeled supporting data tables, organized by LO

Table 3. Findings for Degree Program Learning Outcomes

	Number and Percent of Students at each Level (2, 1, 0)											
	Fall 2011/Spring 2012			Fall 2012/Spring 2013			Fall 2013/Spring2014			Fall 2014/Spring 2015		
Program Learning Outcomes	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
1. Understand basic analytic arguments using such common notions as epsilon/delta, infinite sums, and limits												
• Math 152	3 (75%)	1 (25%)	0 (0%)	14 (30%)	22 (48%)	10 (22%)	19 (46%)	12 (29%)	10 (25%)	31 (43%)	26 (35%)	17 (23%)
• Math 221	1 (10%)	5 (50%)	4 (40%)	10 (21%)	35 (75%)	2 (4%)	2 (5%)	23 (52%)	19 (43%)	6 (15%)	17 (41%)	18 (44%)
2. Understand basic algebraic and discrete notions, such as facts about vector spaces and counting arguments.												
• Math 218	1 (8%)	8 (61.5%)	4 (31.5%)	4 (36%)	7 (64%)	0 (0%)	9 (33%)	13 (48%)	5 (19%)	19 (40%)	20 (43%)	8 (17%)
• Math 228	12 (40%)	18 (60%)	0 (0%)	7 (41%)	10 (59%)	0 (0%)	15 (37.5%)	22 (55%)	3 (7.5%)	5 (25%)	15 (75%)	0 (0%)
3. Be able to follow and recreate algebraic proofs, with a good understanding of groups.												
• Math 366	12 (28%)	25 (58%)	6 (14%)	NR	NR	NR	8 (31%)	14 (54%)	4 (15%)	12 (57%)	9 (43%)	0 (0%)
4. Be able to both follow and recreate analytic proofs, including basic ideas involving abstract metric spaces and differential equations.												
• Math 377	1 (6%)	11 (69%)	4 (25%)	NR	NR	NR	6 (27%)	12 (55%)	4 (18%)	9 (50%)	9 (50%)	0 (0%)
5. Be able to independently investigate more advanced topics in mathematics and present their results to others in a clear way.												
• Math 450							9 (53%)	8 (47%)	0 (0%)	10 (40%)	13 (52%)	2 (8%)

Table 9. Mathematics 450

Course Learning Outcomes	**Number of Students at each Level (2, 1, 0)**			**Number of Students at each Level (2, 1, 0)**		
	Spring 2014			**Spring 2015**		
	2	**1**	**0**	**2**	**1**	**0**
1.1 Completeness /Thoroughness	10	5	2	11	12	2
1.2 Correctness	8	9	0	12	10	3
1.3 Motivation	7	9	1	n/a	n/a	n/a
2.1 Completeness /Thoroughness	11	6	0	15	9	1
2.2 Correctness	10	7	0	17	7	1
2.3 Motivation	8	9	0	n/a	n/a	n/a

Note: The spring 2015 professor did not grade for motivation because s/he did not ask students for their broader motivation for their proofs.

Levels:

2 – Exceeds

1 – Satisfactory

0 – Does Not Meet

Table 10. Mathematics 450 Assessment Rubric for Written Assignment

(1) The student will be able to present a mathematical topic or proof in writing.	2 - Strong performance	1 - Acceptable performance	0 - Unacceptable performance
1.1 Completeness /Thoroughness	The student's written presentation is thorough. It includes a large amount of relevant information about the topic or proof, and reflects a deep understanding.	The student's written presentation covers some useful information about the topic or proof, but is missing some important parts.	The student's written presentation is superficial. It is missing a large amount of relevant information and provides only limited information about the topic or proof.
1.2 Correctness	The student's written presentation contains no, or few, mathematical mistakes.	The student's written presentation contains a significant number of mathematical mistakes.	The student's written presentation contains pervasive mathematical mistakes that would impede a reader's understanding of the subject.
1.3 Motivation	The student's written presentation makes clear why the topic or proof is important.	The student's written presentation contains limited information about why the topic or proof is important.	The student's written presentation does not contain information about why the topic or proof is important, or the information is incorrect.

Table 11. Mathematics 450 Assessment Rubric for Oral Assignment

(2) The student will be able to present a mathematical topic or proof orally to his or her peers.	2 - Strong performance	1 - Acceptable performance	0 - Unacceptable performance
2.1 Completeness /Thoroughness	The student's oral presentation is thorough. It includes a large amount of relevant information about the topic or proof, and reflects a deep understanding.	The student's oral presentation covers some useful information about the topic or proof, but is missing some important parts.	The student's oral presentation is superficial. It is missing a large amount of relevant information and provides only limited information about the topic or proof.
2.2 Correctness	The student's oral presentation contains no, or few, mathematical mistakes.	The student's oral presentation contains a significant number of mathematical mistakes.	The student's oral presentation contains pervasive mathematical mistakes that would impede a reader's understanding of the subject.
2.3 Motivation	The student's oral presentation makes clear why the topic or proof is important.	The student's oral presentation contains limited information about why the topic or proof is important.	The student's oral presentation does not contain information about why the topic or proof is important, or the information is incorrect.

APPENDIX C

Findings for Course Learning Outcomes

Table 3. Mathematics 152

	Number of Students at each Level (2, 1, 0)														
	Spring 2011 (n = 2)			**Fall 2011/Spring 2012 (n= 4)**			**Fall 2012/Spring 2013 (n = 46)**			**Fall 2013/Spring 2014 (n=41)**					
Course Learning Outcomes	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I. Compute and understand limits	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	19	15	7	32	31	11
II. Compute and understand derivatives	1	1	0	3	1	0	18	24	4	18	15	8	28	22	24
III. Solve application problems using derivatives	1	1	0	2	1	1	10	26	10	4	17	20	12	25	37

Note: Spring 2011, some sections of Math 152 had no BA majors. AY 2011-12 is combined BA and BSED students. From AY 2012-13 and on includes all majors. n/a denotes invalid data (the learning outcome was stated incorrectly in year one; therefore, the data was not useful).

Table 4. Mathematics 218

	Number of Students at each Level (2, 1, 0)														
	Spring 2011 (n=7)			**Fall 2011/Spring 2012 (n=14)**			**Fall 2012/Spring 2013 (n=11)**			**Fall 2013/Spring 2014 (n=27)**			**Fall2014/Spr15 (n=49)**		
Course Learning Outcomes	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I. Prove mathematical statements	3	3	1	5	6	3	3	8	0	10	12	5	17	19	13
II. Understand sets and functions (including properties and applications)	3	0	4	8	4	2	10	1	0	13	10	4	19	20	10
III. Prove suitable mathematical statements by induction	3	1	3	5	1	8	2	7	2	11	12	4	13	23	13
IV. Solve basic combinatorial problems	2	5	0	1*	4*	0*	4	7	0	7	14	6	18	22	9

Note: Spring 2011 (BA students only), one student did not attend class after the first test and is not included in the table above or in the "*n*". Fall 2011 is combined BA and BSED students. Fall 2011, two students are not included in table. *One section of Math 218 (n=9) did not cover course learning outcome IV. NR – not reported by faculty. Spring 2013 one student was not involved in class and is not reported in the "*n*" or in the table.

Table 5. Mathematics 221

		Number of Students at each Level (2, 1, 0)														
		Fall 2011/Spring 2012 (n=11)			Fall 2012/Spring 2013 (n=48)			Fall 2013/Spring 2014 (n=44)			F14/Spr15 (n=41)					
Course Learning Outcomes		**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I.	Compute definite and indefinite integrals using varied techniques	2	5	3	42	5	0	5	25	14	19	11	11			
II.	Determine convergence of sequences and series	2	6	3	29	18	1	3	19	22	9	15	17			
III.	Apply integration to compute areas and volumes of revolution	3	7	1	20	26	2	11	18	15	24	8	9			

Note: Three students did not finish the semester in Fall 2011 (BA only), not included in the "*n*". Fall 2011 is combined BA and BSED students.

Table 6. Mathematics 228

	Number of Students at each Level (2, 1, 0)														
	Spring 2011 (n = 14)			**Fall 2011/Spring 2012 (n=30)**			**Fall 2012/Spring 2013 (n=17)**			**Fall2013/Spring2014 (n=40)**			**F14/Spr15 (n=20)**		
Course Learning Outcomes	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I. Solve systems of linear equations	12	2	0	30	0	0	17	0	0	37	2	1	20	0	0
II. Perform computations involving matrices	14	2	0	30	0	0	17	0	0	35	4	1	19	1	0
III. Apply and verify linearity of transformations	4	4	6	21	9	0	14	3	0	20	19	1	12	8	0
IV. Understand and apply vector space definitions and properties	5	7	2	12	17	1	8	9	0	15	22	3	10	10	0

Fall 2011 is combined BA and BSED students only. NR – not reported by faculty

Table 7. Mathematics 366

		Number of Students at each Level (2, 1, 0)														
		Spring 2011 (n=9)			**Fall 2011/Spring 2012 (n=43)**			**Fall 2012/Spring 2013**			**Fall 2013/Spring2014 (n=26)**			**F14/Spr15 (n=21)**		
Course Learning Outcomes		**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I.	Understand and apply definitions of group, subgroup	4	3	2	25	13	5	NR	NR	NR	14	9	3	**14**	**7**	**0**
II.	Understand and apply definitions and properties of cyclic group, permutation group, factor group	2	4	3	18	20	5	NR	NR	NR	9	13	4	10	10	1
III.	Understand and apply definitions and properties of homomorphism, isomorphism	2	4	3	14	24	5	NR	NR	NR	15	8	3	6	10	5

NR – not reported by faculty

Table 8. Mathematics 377

	Number of Students at each Level (2, 1, 0)														
	Spring 2011 (n=9)			**Fall 2011/Spring 2012 (n=16)**			**Fall 2012/Spring 2013**			**Fall 2013/Spring2014 (n=22)**			**Fall2014/Spr15 (n=18)**		
Course Learning Outcomes	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
I. Understand the topology of the real line	5	1	0	11	4	1	NR	NR	NR	7	14	1	7	9	2
II. Rigorously determine/prove convergence of sequences	4	2	0	7	7	2	NR	NR	NR	9	8	5	12	6	0
III. Rigorously determine/prove continuity and uniform continuity of functions	2	3	1	3	10	3	NR	NR	NR	6	14	2	8	7	3
IV. Understand distinct types of convergence of sequences of functions	0	5	1	1	11	3	NR	NR	NR	NR	NR	NR	6	9	3

Note: Spring 2011 three students were not scored because they stopped showing up for class after the first week. NR – not reported by faculty.

Table 9. Mathematics 450

Course Learning Outcomes	**Number of Students at each Level (2, 1, 0)**			**Number of Students at each Level (2, 1, 0)**		
	Spring 2014			**Spring 2015**		
	2	**1**	**0**	**2**	**1**	**0**
1.2 Completeness /Thoroughness	10	5	2	11	12	2
1.2 Correctness	8	9	0	12	10	3
1.3 Motivation	7	9	1	n/a	n/a	n/a
2.2 Completeness /Thoroughness	11	6	0	15	9	1
2.2 Correctness	10	7	0	17	7	1
2.3 Motivation	8	9	0	n/a	n/a	n/a

Note: The spring 2015 professor did not grade for motivation because s/he did not ask students for their broader motivation for their proofs.