

End of Year Assessment Report for Programs

Program: Mathematics	Semester/year: 2018-2019
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Program Mission Statement

The principal goals of the mathematics program at Greenville College are to foster students who value mathematics for its own sake and value it as a means of describing God’s universe. The program seeks to prepare students for advanced study in mathematics and to perform in the work force. The mathematics program also serves to assist in the preparation of students for advanced work in complementary fields.

Program Objectives

At the close of their degree successful students will be able to:

1. Integrate a variety of mathematical concepts and skills into problem solving.
2. Construct and communicate creative work, including proofs, using the language and symbolism of mathematics.
3. Solve problems using technology.
4. Develop a breadth of knowledge in the applications of mathematics.

Assessment Methods and Benchmarks – SPRING SEMESTER

For each program objective, choose one “best representative” assignment at the Introductory, Developmental, and Mastery levels. You will have a total of three assignments/measurements per program objective. Put this information in a chart. Refer back to your Program Learning Objective Alignment Chart to determine best representative assignments and benchmarks. In any given semester, you may not have assignments at all three levels for every program objective; simply report all that you can.

Program Objective	Introducing	Developing	Mastering
1. Integrate a variety of mathematical concepts and skills into problem solving.	MATH116 Final Exam	Not taught this semester	MATH302 Exam Average
	Benchmark: $\geq 55\%$	Benchmark: $\geq 75\%$	Benchmark: $\geq 55\%$
	Evidence: 60% (100% of majors) completion	N/A	Evidence: 100% completion
2. Construct and communicate creative work, including proofs	MATH116 Seq. & Series Exam	MATH312 Final Exam Proofs	MATH302 Geom. Exam Average
	Benchmark: $\geq 55\%$	Benchmark: $\geq 60\%$	Benchmark: $\geq 60\%$
	Evidence: 87% completion	Evidence: 100% completion	Evidence: 83% completion
3. Solve problems using technology.	<i>Not taught this semester</i>	<i>Not taught this semester</i>	MATH199 Prog. Assign. & quizzes
	Benchmark: $\geq 75\%$	Benchmark: $\geq 75\%$	Benchmark: $\geq 60\%$
	N/A	N/A	Evidence: 80% completion
4. Develop a breadth of	MATH116 Average of 2 applied	<i>Not taught this semester</i>	MATH 304 Course Grade

knowledge in the applications of mathematics.	exams		
	Benchmark: $\geq 60\%$	Benchmark: $\geq 75\%$	Benchmark: $\geq 65\%$
	Evidence: 92% completion	Evidence: 87% completion	Evidence: 100% completion

Analysis of Assessment Findings – SPRING SEMESTER

P01: A. (Integrate a variety of mathematical concepts and skills into problem solving.) The introductory assessment for this objective is fairly challenging for the whole class as it is the Calculus II final. However, all majors (3/3) and the possible majors (2/2) passed the assessment even though only 60% of the whole class did. I think that providing some extra problems for students to work that were not from the book was a good thing. This came from our observation of students using the internet increasingly for solutions. However, the student use of the internet for correct solutions has greatly increased. We will need to increase our use of these extra problems.

B. not taught

C. MATH302 exams. This is a reasonable assessment (the exam average). However, one of the exams is quite easy and a little less focused on problem solving.

P02:

A. MATH116 Seq. and Series first exam is good for this. The students did pretty well even inside a fairly weak class.

B. MATH312. We adjusted this assessment (at the beginning of the semester) to be just the proof problems on the final. All students in a very solid class passed.

C. MATH302. The geometry exam average is a good assessment of this. These are proof heavy. The data suggests most of the students are at the master level.

P03: (Solving problems with Technology):

A. not taught

B. not taught

C. MATH199 was a challenging (for the prof. and the students) new course taught partially (primarily) to serve the engineering program. 80% of students hit the benchmark. I don't know how well this served our students. Teaching programming away from interterm did give them more time to work on their final project which was good for many. The slower pace and mixing with Matrix Algebra seemed to water down the first part of the class and students were less engaged at first. This is also a difficult place to serve as mastery for solving problems with technology but is only the required programming class.

P04: (Develop a breadth of knowledge in the applications of mathematics.)

A. The students did well with a 92% benchmark rate on the applied chapter exams.

B. Not taught

C. Applied Mathematics was an independent study for two students. Andy and I team taught the class. It was OK and both students met

the adjusted benchmark. We adjusted the assessment because we did not do a written final and question whether a written final is the correct assessment for master here.

Sharing and Discussion of Assessment Findings – SPRING SEMESTER

PO1: I think the Calc II final performance is unnecessarily low for the whole class and I expect some changes to Calculus I and Calculus II to help. The main thing will be assignments sets that they will need to struggle with more. We may have a few more students drop but those that stay in should learn more.

I think when using MATH302 for this we should bump up the benchmark to 65% and use the 3 exams that are more focused on problem solving. (Retroactively this would have excluded 2 students that Andy and I agree are not quite at the mastery level.)

PO3: We discussed the issues with assessing technology use and the timing of the courses where it is assessed. We did not come to any definitive conclusions other than that we definitely need all majors to continue taking programming.

Andy and I discuss all these findings and will approach them again in our fall meeting to prepare for the fall. We will also attend to our FCARs from the last time a class was taught.

Use of Assessment Findings for Program Improvement (Action Plan) – SPRING SEMSTER

(A)

(1) More problems need to be created by us for MATH116 (and MATH115) the students are getting much less from homework due to the internet. Also, we can't see how students are doing by grading homework that has internet solutions. I will create some problem sets for MATH115 over the summer in preparation for fall. Problems for MATH217 that are of a more computational nature will be written by Andy as well to go with the more theoretical ones he has written. He will use fewer of the theoretical problems per set. I will also do more work preparing problems for MATH218 for fall. These are the biggest and most demanding changes to our courses.

For MATH199 I will restructure the class to do the matrix algebra part first in less than $\frac{1}{2}$ a semester and then we can focus on the programming. I felt that we lost momentum in programming by the interleaving with the matrix algebra.

(2) In MATH302 for PO1 we will bump up the benchmark to 65% and use the 3 exams that are more focused on problem solving.

(B) Briefly summarize the status of the previous years' or semester's action plans. Are they complete, still being implemented, on hold, or some other status?

We are definitely pushing forward with the writing of extra problems. MATH115, 217, & 218 are the first up.

Andy's changes to assessing the numerical problems in MATH115 will have to wait until he teaches that course again. I will be attentive to how I assess them this coming semester.

The work on the computational and applied material from MATH218 will continue this coming fall.

The Advanced Calculus changes recommended from F18 will have to wait until F20 when it is taught again.

Utilizing a student worker to keep tabs on struggling students is not as easy as I thought since we have FERPA considerations. However, if a student is helping me in MATH090 again (which I hope) he or she should be able assist some with that since they are involved in teaching the class and will have a working relationship with the students. This has to be done carefully.

(C) We will assess the changes (using new problem sets) to MATH115, 217, and 218 at the end of the fall. We will then also discuss how the 218 students did on the computational and applied material

Full Year Reflection – FALL/INTERTERM/SPRING TERMS

The end of semester and year reports are helping us track what we are doing and where we are going. We are finding it increasingly helpful to keep track of our thoughts. When you have a possible change in mind it is natural to think you will not forget but we do. The most important changes by far are the homework assignment changes. Homework is a core part of learning mathematics and it is being undermined. Our writing of problems can really help. We didn't have a Fall Action Plan.

Supporting Documents

FCARs for all our courses are the supporting documents as well as the Fall Assessment Report.