End of Year Assessment Report for Programs

Program: Mathematics	Semester/year: 2019-2020
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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. (This is the Objective being measured this year.)

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.
Across all objectives in their mathematics courses 79% of our majors met all or all but one of their objectives. Our target is 75%, so we met that.

Program Objective	Introducing	Developing	Mastering
3. Solve problems using technology.	*Not taught this semester*	*Not taught this semester*	MATH306 Prog. Assign. (RK23)
	Benchmark: >=75%	Benchmark: >=75%	Benchmark: >=70%
	N/A	N/A	Evidence: 80% completion

Analysis of Assessment Findings – SPRING SEMESTER

PO3: (Solving problems with Technology):

A. not taught
B. not taught

C. MATH306 is a really good course. I think the book is a nice mix of theory, practice, and technology. Of the students, 80% hit the benchmark. I can tell you for sure 3 of the 5 students did their own coding work and wrote some functional code. The other two I am less certain about.

Sharing and Discussion of Assessment Findings – SPRING SEMESTER

PO3: The students need a little more coding that is not just copied from the website or modified from the book or at least there should be more significant modifications made. The one student who did not meet the benchmark still did well in the class. We reaffirmed that programming is important for our students. We reflected that they are very unskilled as freshman and most don't even know how to do a simple formula in a cell in a spreadsheet. They need more support in Calc. I and Diff. Eq. to succeed and grow at using these types of tools. I need more time spent and more assessment of programming in Numerical Analysis. We also need to partner more with the faculty teaching other programming classes to get a feel for how our majors are doing. We also would like it if all programming assignments had at least one assignment that is numerical in some way.

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

(A) MATH306 for PO3. I thought the class went pretty well, very well considering COVID. The programming was good but I think I still need to ask a little more of them writing code from the ground up. I took a hit late in the semester in terms of content to force them to take the time to write some code from scratch which I gave draft feedback on. It needed even more structure and discussion. It is hard to force that in (and we don't need to do much of it) but I really want all students to have that experience. One student who is very good at leveraging online information didn't ever really force herself to produce good code. She reflected that she grew the most (reflected in her final) on an assignment that forced her to explain every line of a piece of code.

(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?
This is not part of the computation objective but we are both pushing forward with the writing of extra problems (George) and using quizzes more for assessment (Andy). George did the full semester for MATH115 and it worked wonderfully! The students didn't mind. I didn't have to worry that they were just copying from the internet. Andy's didn't go as well with a student or students using Chegg and submitting his custom homework to have the Chegg people work it out. There were also some repeat extra problems from the previous year and a student from last year had submitted some which appeared on Chegg. So Andy switched to quizzes in the spring for Calculus II and that worked well for him. He is still tweaking that as some students didn't pay as much attention to homework as he would have liked. MATH217 & 218 will get more hand-created problems this coming fall.

(C) For MATH115 Andy will use pairs rather than larger groups for the numerical assignments. Andy will make an introductory Excel and Google Sheets video to provide resources. We are hoping to see increased completion and understanding of using computational tools.
For 218, the hand-written problems continue to need to be organized pre-semester and expanded some. The numerical work and

assessment needs to change! I think I am going to have them start the work on the spreadsheets in class and also insist that they come by an office hour to talk about their solutions. We need students to engage the numerical side more fully. A video or videos introducing the use of Excel will be created and available to students to provide support without losing more class periods. This can build on a video made for Calc. I students to prepare for basic Excel.
We will discuss the Advanced Calculus changes for F20 this August.
In Numerical Analysis I need to provide more assessment and a little more code writing from scratch. That can possible be supported with videos if I can't spare the class time.

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 and moving to quizzes. Homework is a core part of learning mathematics and it is being undermined but we are finding ways to address it. Our writing of problems and giving quizzes can help and has helped. While it is difficult to attach clear quantitative evidence to this, the morale of the faculty members has been greatly increased with the assessment changes. We know that requiring students to do their own work while having support is preferable to their copying solutions they don't understand.

Supporting Documents

FCARs for almost all our courses are the supporting documents (definitely FCARS for all courses involving a DO3 assessment) as well as the Fall Assessment Report.