

MATH 2016-2017 Assessment Report

The MATH report and plan will naturally overlap significantly with CS, MATH, and PHYS because all three majors are incorporated within MPS. This is inevitable because all three majors use components of the other two. Moreover, faculty are expected to participate in all three for practical planning and teaching purposes and we evaluate students collectively.

1. Program Mission Statement

The Mathematics major at Wells College provides a solid introduction to mathematical principles such as computation, proof, and application. By necessity, this requires students to learn to communicate these notions both to other experts and to those who are unfamiliar with the technical ideas. The program seeks to produce graduates capable of performing in private, public, and professional situations in which mathematics is useful and desirable.

2. Program Goals

See attached table of goals, objectives, outcomes, and measurement tools.

3. Learning Objectives

See attached table.

4. Measurable Learning Outcomes

Again, see the attached table. Some further commentary follows.

As in the past, we have mainly relied on Senior Thesis projects, presentations, and papers in the courses of MPS 402 and 403 in final evaluations of our majors. A continuing goal has been to involve (at least) a second input and reader for these projects. In the past, and continuing, there has been a single faculty member who organizes the course, provides feedback, and in fact gives the actual grade. We have been striving and requiring for students to seek secondary expert support for their projects but not all have complied. We intend to continue working on this.

Of course, some have complied, but it hasn't been universal. Other than issuing low grades, including F, there doesn't seem to be a good mechanism. We have found this especially prevalent among the CS majors, who tend to see a (sort of but not great) working computer program as a success. There are some good ones of course, but the culture is rather sketchy.

Ironically, the CS major ought to be the most measurable outcome major. But it's often the one with weakest results. It's something to keep chasing.

Also regarding CS commentary, as some long previous faculty had been able to accomplish we no longer get so many women majors or minors. The culture owing to more male colleagues cannot be

the only explanation. Rather, only a few (two to five) years of condescending, geeky attitudes managed to kill 30 years of progress. That geeky stuff puts me off as an adult, let alone a savvy first semester young woman who might be smarter than all the guys in the room.

As for basic math, many results are easy to measure. Either answers are right or they are not. Generally, we have found good results in some classes and not in others. For example, Calculus II and III are generally pretty receptive, as is Calculus I in the fall. However, the other introductory math classes are all over the place, most likely due to choices of the students who are in them.

It is important, though, that faculty meet students where they are rather than complain about their sometimes weak preparation. The latter is merely an easy out. And we get paid to address those shortcomings. For instance in MATH 151: Elementary Statistics, a course required for many other majors, students have to be able to sketch a line and understand the significance of slope. While those are concepts expected of any high school graduate, we often are obligated to return to them. We cannot send students back to high school. Similarly, we have noted a developing problem with the ability of introductory calculus students to perform algebraic manipulations consistently. But we cannot ignore them, having admitted the students to the College.

In most cases, it is not a problem of remediation *per se*. Rather, many students are inconsistent and do not see math as an easy subject in the sense that everything happens for inarguable reasons. (We can talk about literature and history all semester and never be able to say for sure that some things are "true." But with math we can.) In any event, we need to continue to address this basic problem. While much of it is surely due to poor high school preparation of various sorts, it is nevertheless our concern now.

5. Means of Assessment of Outcomes

See the attached table.

The MPS major meets annually, in addition to meeting informally (including via e-mail) about individual students quite frequently, so as to plan and to monitor senior thesis progress and potential problems with either individual students or courses. The group met in person several times. Senior theses are especially a group effort. This year MPS specifically held an in-person group meeting involving of Professors Cummins, Heinekamp, Hogan, and Stiadle on Thursday, May 11 to discuss assessment and to re-cap seniors' progress.

It is worth commenting here on senior theses since we use these as a principal way to evaluate student growth in MPS content as well as presentation skills and writing acumen. We had nine theses this year, including one by a double major who chose to do her math thesis this year and will complete a thesis for another major in her senior year. Of three CS, five math, and one physics theses, none was distinctive. One of the CS pieces was close. Some other students were responsive to criticism and wrote well yet didn't really strive for tough topics. And some just did not try or were otherwise unresponsive. As above, we believe there needs to be more mentoring and more pro-active work on the part of students.

6. How Assessment Data Will Be Utilized

Many points were made above about what to do as we progress. Most of the math data concern students or portions of courses. Mainly these are about introductory student competence and the senior thesis. They will be addressed as noted before. The biggest work of MPS this year is about re-vamping the CS major to make it whole and sustainable. We deleted CS 222, which had never been taught, as well as CS 103 and 107, which have not been offered in a number of years. CS 131 and 132 descriptions were modified to reflect current practice. And a new course, CS 233: Object-Oriented Programming was developed. The CS major continues to evolve to reflect changing standards and new faculty. This process will go forward next year as we evaluate these changes and make more.