

Millikin University  
Annual Assessment of Student Learning in Mathematics  
By Dr. Joe Stickles, Chair  
July 1, 2016

**Executive Summary**

The Department of Mathematics supports Millikin's Mission in that the Department works to prepare students for:

professional success by providing all of our majors with core mathematical experiences and a range of application areas, and through the various emphases, readying them to enter the work force or pursue graduate study, democratic citizenship in a diverse a

## Report

### Goals

The mission of the department is to produce graduates, regardless of emphasis, who are able to:

1. integrate and differentiate functions,
2. express and interpret mathematical relationships from numerical, graphical, and symbolic points of view,
3. read and construct a subject in mathematics,
4. analyze various discrete and continuous probability models,
5. apply mathematics to other disciplines, and
6. present mathematical results and arguments orally and in writing.

In addition to the above core learning goals, mathematics graduates will achieve the following emphasis-specific goals.

- c. compile a portfolio of materials demonstrating the following in the field of mathematics: content knowledge, pedagogical content knowledge, an ability to plan instruction, and analyze and document one's impact on student learning.

### Snapshot

The Department of Mathematics guides students in the completion of three different major tracks: mathematics education (12 students), applied mathematics (9 students) and actuarial science (9 students). Currently, 30 students are following one of our major programs of study. This is an enrollment increase of 6 from last year.

The Department of Mathematics includes the disciplines of mathematics and statistics. The department offers mathematic majors with options in mathematics, mathematics education, and actuarial science. Additionally, a minor in mathematics is offered. The curriculum is structured to meet the overlapping needs of students who fall in one or more of the following categories:

those who plan to become high school mathematics teachers;  
those who intend to pursue graduate work in applied mathematics, computer science, or other related fields; and  
those who will apply mathematics and/or computer science in the natural sciences, social sciences, business or other areas of quantitative studies such as actuarial science.

### Additional Comments:

The three majors offered in the department share courses and faculty. The mathematics and mathematics secondary education majors are particularly entwined with students taking common courses and interacting with the same faculty members. In many respects these two majors cannot be disentangled for analysis. Students can earn either the Bachelor of Arts or Bachelor of Science. The choice of B.A. or B.S. depends entirely on the student's interest in studying a foreign language. There is no distinction in departmental coursework between the B.A. and B.S. degrees. Therefore, this report will not separate the B.A. from the B.S. All fulltime tenure-track members of the department have doctorate degrees and are tenured. (See Table 1.) Our fulltime Math Center director has a masters degree. Since Christine Harshman was hired to be our Math Center director in January 2016, we have had no adjuncts teaching in the department, and given the academic climate of the region, it is unlikely we would be able to find adjunct faculty in the Decatur area.

The mathematics major is for students interested in immediate employment in a mathematical area or further study in mathematics. Mathematics majors take a minimum of 42 credit hours in mathematics as well as an additional 15 hours in a content area in which mathematics is applied. The selection of the core and required advanced mathematics courses was guided by in *Undergraduate Programs and Courses in the Mathematical*

*Sciences: CUPM Curriculum Guide 2015* by the Committee on the Undergraduate Program in Mathematics of The Mathematical Association of America.

The mathematics education major is a rigorous course of study in mathematics and education. The major has 38 required credit hours in mathematics. Unique among institutions of comparable size we require a mathematics teaching internship experience as part of our program. During this experience the student is paired with a member of the faculty in teaching an undergraduate mathematics course.

The actuarial science option is a rigorous treatment of the mathematics and business skills necessary for a major to enter the workforce as an entry-level actuary. Students who completed this option and all highly recommended courses in business will be prepared to take the first two Actuarial Examinations (1/P and 2/FM) of the Casualty Actuarial Society and the Society of Actuaries and have completed the three courses that are certified by the Society of Actuaries (SOA) for Verification of Educational Experiences (VEE) (Applied Statistical Methods, Corporate Finance, and Economics).

### The Learning Story

All major tracks within the department have a common core of five classes. The material covered in these classes allow students to meet the first five common departmental goals. The sixth common departmental goal is met through our MA499 course, where mathematics and actuarial science students complete a research project, write a report on their findings, and give an oral presentation to the faculty (and occasionally at conferences external to the university). This goal is also met through MA425, MA471, and ED478 for mathematics education majors since they make a vast number of presentations about mathematics through teaching. The remaining requirements are tailored to meet the specific needs of each track, and they also address many of the common goals. The mathematics majors concentrate proof writing and applications of mathematics to other disciplines. Actuarial science students meet VEE requirements and prepare for SOA examinations. Mathematics education majors study material covered on the state's content knowledge exam and hone their teaching skills in a number of courses.

### Assessment Methods

All Millikin students are required to pass the mathematics placement exam or MA 098 prior to receiving credit for a QR course or receive an equivalent math ACT sub-score (22). The department now tests all students wanting to take calculus with the Millikin calculus readiness exam,



better), and all students who took MA471 achieved a grade of C or better, which means that

department's decision to use Hawkes throughout the developmental sequence for the upcoming year.

Continue supporting Dr. Joe Stickle's efforts in attaining the Associate credential from the Society of Actuaries.

Improve student success rate on actuarial exams. Besides supporting Dr. Stickle's efforts, more needs to be done to help students pass at least one examination before graduation. We will be updating the curriculum in the MA215 class to help prepare for the Exam FM exam, and we will be piloting a new review course for Exam P in the spring semester.

Track the students who took the new placement and calculus readiness exams.

Depending on students' success in the courses in which they were placed, we will adjust cut scores accordingly for future administrations of the exams.

Finish handbook for MA499 to help better guide our mathematics and actuarial

Appendix

Curriculum Matrix  
Mathematics Core Classes

MA 140    MA 208    0MA  
                         MA 240



Curriculum Matrix  
Actuarial Science

			MA
MA	2	2	3
	1	3	1
	5	0	3