

Department/Program:	Chair/Director: Iztok Hozo	Assessment cycle/year:
Mathematics and Actuarial Science	Email address: ihozo@iun.edu	2013-14

### Mission/Purpose

**TEACHING**

It is the highest goal of the Department of Mathematics and Actuarial Science at Indiana University Northwest to provide excellent quality education and training in mathematics and actuarial science while also providing the required mathematics courses for education, physical, and life sciences students. It is also our goal to provide quality general education mathematics courses for all IU Northwest students, regardless of their program of study.

**SCHOLARSHIP**

The faculty in the Department of Mathematics and Actuarial Science demonstrates a high level of commitment to continued scholarship in a variety of focus areas, including pure and applied mathematics, actuarial science, and the scholarship of teaching. The faculty remains dedicated to ongoing professional development for all members of the department.

**SERVICE**

Faculty members in the Department of Mathematics and Actuarial Science actively seek to engage in the educational needs of the communities surrounding Indiana University Northwest. It is our goal to work cooperatively and collaboratively with other departments at IUN, and the governments and educational systems throughout the region we serve, to improve the quality of life for the citizens of Northwest Indiana.

The activities of the Department of Mathematics and Actuarial Science directly fulfill the IUN Mission, Vision, and Strategic Plans. Our curriculum is designed to provide excellent education in mathematics and actuarial sciences and support curriculum of other departments in the College of Arts and the Sciences and in other divisions of IUN.

The Department of Mathematics and Actuarial Science is academically central to the mission and strategic vision of Indiana University Northwest because of our service role in providing general education courses. Our graduates consistently find jobs in Northwest Indiana and the greater Chicago land area. Indiana University Northwest is also the **only** public university in the seven county region offering a BS degree in Actuarial Science. Existence of our actuarial degree significantly contributes to IU Northwest excellence in business and economics.

### Student learning outcomes (Goals):

- Goal 1. Use mathematical models such as formulas, graphs, and tables to draw inferences.
- Goal 2. Represent mathematical information symbolically, visually, numerically, and verbally.
- Goal 3. Use arithmetic, algebraic, geometric, logical, and / or statistical methods to model and solve real world problems.

### Which Student learning outcomes (Goals) did you assess this year?

1., 2. And 3.

## Assessment Summary

Outcomes/Objectives	Measure(s)	Findings	Action Plans
1. Represent mathematical information in writing	Students will revise their senior thesis several times and present in COAS students conference or some other venue.		
2. Improve math placement exam readiness	Math placement exam scores	35% of students were placing bellow Algebra 1.	Provide free seminars (STEP) for students to help them prepare. Math Department obtained an internal grant in 2013 in order to address this problem. We are moving the funding to budget item line in 2015.
3. Improve math placement exam quality of questions	Quality control of 110 placement exam questions (over 2600 students)	We are finding that the newly-designed placement test is performing admirably well.	We will continue monitoring the successful placement of incoming students and fine-tune the placement test as needed.
4. Prevent retention problems after new state requirements to send students to Ivy Tech in case they fail the placement exam!	Math placement exam scores.	About 120 admitted IUN students per calendar year need affordable and convenient refresher class.	Using internal support from Academic Affairs, we created a FREE college preparatory course program. We plan to increase the offerings in the 2015.
5. Create On-Line classes	One of our senior faculty invested significant amount of time and effort in order to develop an on-line version of Finite Mathematics course. The online classes are performing well and we plan to use these experiences to expand our online offerings. In 2014 another senior faculty member started the process to create an online version of our Math-M 100 Basic Mathematics class. We plan to offer the first section of online Math-M 100 in Fall 2015.		
6. We have common mid-term and common final exams in M118 and M100 general education courses. As needed, we look at students' achievements. Math faculty group selects specific problems from these exams that address the three goals (1)-(3). The faculty group will develop a rubric that is based on three outcomes, randomly select a group of students that received a grade of C or better in a course, and analyze work of these students as excellent, satisfactory, or needs improvement. If less than 75% of students score satisfactory on a particular outcome, we will review and revise where necessary the content and coverage of the outcome in our courses for further improvement. We perform this task sporadically, every several years, as needed.			
7. Statistics courses on campus	Compare the content, and assess various Statistics courses on campus, including Math-K 200 Statistics for Teachers	The report has been delivered and presented to Faculty Organization.	One of the Math faculty, Dr. Vesna Kilibarda is addressing any relevant changes in our Math-K 200 Statistics for Teachers class. Overall, the finding was that the statistics classes on our campus are fairly well aligned.

## Analysis Questions

*Based on your findings and action plans, what primary changes will you make for student learning? Program outcomes? Changes to the assessment process?*

1. Already implemented. Our Math-M 493 Thesis class serves as intensive writing as well as capstone class!

2. After we started the free seminars, the percentage of students failing our placement exam dropped to approximately 20%. We will continue monitoring and administering free seminars as long as we have fund available and as long as results are evident. We are looking for ways to have the free seminars (STEP program) converted to line item in our budget. We plan to continue to collect statistics with success rates in successive classes keep tracking the size of each session and the passing rate (such as the table on the right).

	2013	2014*
<b>Math Placement Passing rate of STEP Workshops of 8 students or less</b>	71%	78%
<b>Math Placement Passing rate STEP Workshops of 9 students or more</b>	68%	75%

3. We revised the “questionable” items by decreasing guessing probability and also lowering chances for a good student to make a minor mistake. Both lead to better placement and improved student success and retention rate. We continue to monitor and analyze placement exam questions and passing rates. For example, before and after the substantial revision of the placement exam (March of 2012), we had the following breakdown of the passing rates:

	Sum 10	Fall 10	Spr 11	Sum 11	Fall 11	Spr 12 <sup>1</sup>	TOTALS before changes
<b>MA101</b>	153(34.5%)	126(42%)	171(34%)	260(34%)	106(43.6%)	17 (15%)	<b>833(35.2%)</b>
<b>MA102</b>	17 (38.7%)	102(35%)	105(21%)	220(29%)	58(23.9%)	13(11.5%)	<b>670(28.3%)</b>
<b>MA103</b>	105(23.6%)	62(21%)	183(36%)	249(32.5%)	72(29.6%)	61(54%)	<b>732(30.9%)</b>
<b>MA104</b>	14(3.1%)	6(2%)	39(8%)	35(4.5%)	5(2.1%)	15(13.3%)	<b>114(4.8%)</b>
<b>MA105</b>	0 (0%)	1(0.3%)	5(1%)	2 (0.3%)	2(0.8%)	7(6.2%)	<b>17(0.7%)</b>
<b>TOTAL</b>	444	297	503	766	243	113	<b>2366(100%)</b>

<sup>1</sup> before changes and introduction of STEP

After the revision of the placement exam and introduction of the STEP program, the placement results changed dramatically:

Place level	Class to take	Spr 12 <sup>2</sup>	Summ 12	Fall 12	Spr 13	Sum 13	Fall 13	Spr 14	Summ 14	TOTALS after changes
<b>MA 101</b>	<b>FREE class M015</b>	54 (17.4%)	151 (22.6%)	45 (32.6%)	104 (18.6%)	130 (19.5%)	29 (17.3%)	50 (14.1%)	86 (16%)	<b>649 (19.1%)</b>
<b>MA 102</b>	<b>A100</b>	61 (19.7%)	195 (29.1%)	36 (26.1%)	115 (20.5%)	189 (28.4%)	56 (33.1%)	68 (19.2%)	132 (24.6%)	<b>852 (25.0%)</b>
<b>MA 103</b>	<b>M117 or M100</b>	139 (44.8%)	263 (39.3%)	45 (32.6%)	263 (47%)	264 (39.6%)	70 (41.4%)	171 (48.2%)	257 (47.9%)	<b>1472 (43.3%)</b>
<b>MA 104</b>	<b>M125/126/127 or M118</b>	43 (13.9%)	52 (7.8%)	12 (8.7%)	61 (10.9%)	73 (11%)	14 (8.3%)	54 (15.2%)	53 (9.9%)	<b>362 (10.6%)</b>
<b>MA 105</b>	<b>M215</b>	13 (4.2%)	8 (1.2%)	0 (0%)	17 (3%)	10 (1.5%)	0 (0%)	12 (3.4%)	8 (1.5%)	<b>68 (2.0%)</b>
<b>Totals</b>		<b>310</b>	<b>669</b>	<b>138</b>	<b>560</b>	<b>666</b>	<b>169</b>	<b>355</b>	<b>536</b>	<b>3403</b>

4. We have increased our offerings of FREE sections of Math-M 15 to three to four per semester to give the students in this program a chance to raise their math skills to college level while attending their other classes. This greatly improves the retention rate as many of these students would probably be gone from our University, discouraged and possibly abandoning higher education goals entirely.

5. We are already offering on-line version of Math-M 118 Finite Mathematics sections. We will monitor the success rate and enrollment levels of these sections and compare them to our regular on-campus sections. The results will influence the quantity and method of delivery of our Math-M 118 sections in the future and possibly expand our selection of on-line courses beyond Finite Math.  
We are introducing an online section of Math-M 100 Basic Mathematics in Fall 2015.

6. Continuous improvement.

7. Continuous improvement.

<sup>2</sup> after March changes