

Department/Program:	Chair/Director: Axel Schulze-Halberg	Assessment cycle/year:
Mathematics and Actuarial Science	Email address: axgeschu@iun.edu	2018-19

Mission/Purpose

TEACHING

It is the highest goal of the Department of Mathematics and Actuarial Science at Indiana University Northwest (IUN) 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 IUN 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 IUN because of our service role in providing general education courses. Our graduates consistently find jobs in Northwest Indiana and the greater Chicago land area. IUN 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):

1. Use mathematical models such as formulas, graphs, and tables to draw inferences
2. Represent mathematical information symbolically, visually, numerically, and verbally
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
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1. Represent mathematical information in writing	Students will create and revise a mathematical article either as part of their senior thesis (MATH-M493 in our Mathematics BSc/BA programs) or within a Mathematics course that involves intensive writing (MATH-M320 in our Actuarial Science BS program). In addition, their work will be presented at one or several undergraduate conferences.		
2. Improve mathematics placement exam readiness	Mathematics placement exam scores	Placement exam results do not match student knowledge level accurately.	We provide a free online refresher course, called "Seminar Towards Effective Placement" (STEP).
3. Prevent enrollment loss due to failed placement exam	Mathematics placement exam scores	About 120 admitted IUN students per calendar year need an affordable and convenient refresher class. The snapshot of anecdotal data is enclosed.	Using internal support from Academic Affairs, we created a free college preparatory course program, called "Arithmetic with Algebra" (MATH-M 15). Four sections of this course are offered per semester.
4. Create On-Line classes	The online classes are performing well and we plan to expand our online offerings. In addition to the existing online courses "Finite Mathematics" (MATH-M 118) and "Basic Mathematics" (MATH-M 100), we are now teaching several upper level online classes.		
5. We have common mid-term and common final exams in MATH-M 118 and MATH-M 100 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.			
6. Increase the number of Mathematics majors	Track the number of mathematics majors and engage in recruiting more qualified students	The number of students is stable with a recent increase in Actuarial Science.	We track the number of our majors and their demographic data in order to determine the optimal strategy for recruitment. In addition, we gather DFW rates of our classes. Furthermore, we heavily promoted internships and scholarships in Actuarial Science. In addition, our faculty member Michelle Guan has obtained grants to fund our students, and organized presentations by Actuarial Scientists.
7. Study the effect of collaborative learning in our classes MATH-M 100 and MATH-M 117	Effect of collaborative learning on student grades and retention within the "Pedagogical Innovation Group" (PIG) initiative	The results of the study are currently being compiled in an article that is to be submitted for publication. Our faculty members Michelle Guan, Vesna Kilibarda, and Alex Wang are authoring the study.	Based on the results, the study will be continued and / or extended. In addition, we will implement the collaborative learning approach in courses other than MATH-M 100 and MATH-M 117.

8. WebWork	Our faculty member Daniele Rosso implements the use of the "WebWork" online homework delivery system.	We plan to study the effects on student performance and retention.	Generation of data is in process.
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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. This is already implemented. Our MATH-M 493 thesis class and our MATH-M 320 class serve as intensive writing courses.

2. After we started the free seminars, the percentage of students failing our placement exam dropped to less than 20%. We will continue monitoring and administering our free STEP seminar as long as the results are evident. We plan to continue to collect data for generating statistics about student grades and success rates.

3. We continue to offer four free sections of our class MATH-M 15 per semester. This class gives the students an opportunity to raise their skills in mathematics to college level while attending their other classes. This measure greatly improves the retention rate as many of these students would probably leave from our University, discouraged and possibly abandoning higher education goals entirely.

Our Introductory Mathematics Coordinator Stela Pudar-Hozo created a brief version of the IUN mathematics placement scores tables. As always, the fall semester shows the weakest placement scores.

Place level	Class to take	Spring 17	Summer 17	Fall 17	Spring 18	Summer 18	Fall 18
MA101	FREE class M015 arithmetic	66(20.1%)	93(23.19%)	21(26.9%)	63(18.8%)	128(28.2%)	15(20.8%)
MA102	IUN class A100/Algebra1	59(17.9%)	74(19.0%)	21(26.9%)	60(17.9%)	88(19.4%)	16(22.2%)
MA103	M117/Alg2 or M100GenMath	150(46.5%)	166(42.7%)	28(35.9)	148(44.2%)	199(43.8%)	30(41.7%)
MA104	M127 PreCalc&Trig or M118 Finite	43(13.1%)	45(11.6%)	7(9.0%)	57(17.0%)	35(7.7%)	11(15.3%)
MA105	M215Calculus1	11(3.3%)	11(2.8%)	1(1.3%)	7(2.1%)	4(0.9%)	0(0%)
		329	389	78	335	434	72

5. Continuous improvement.

6. Number of majors analysis. We are tracking the number of

Data in the following tables is taken from the IUIE database of all students enrolled in the fall semester of 2018:

Total Number of Students	F				F Total	M				M Total	Grand Total
	Asian	Black	Hispanic	White		Asian	Black	Hispanic	White		
Actuarial Science BS		1		4	5	1	1	1	4	7	
Mathematics BA		3		1	4						
Mathematics BS				2	2	1			3	4	
Mathematics Education BSED	1	2	1	4	8				1	1	
Grand Total	1	6	1	11	19	2	1	1	8	12	31

Number of Students	Actuarial Science BS	Mathematics BA	Mathematics BS	Mathematics Education BSED	Grand Total
21St Century Charter Sch/Gary				1	1
Boone Grove High School				1	1
Chesterton High School			1		1
Calumet New Tech High School	1				1
Crown Point High School	2	1	2	1	6
George Rogers Clark High Schl		1			1
Griffith High School	1				1
Gwendolyn Brooks Coll Prep Aca				1	1
Hammond High School		1			1
Hanover Central High School	1			1	2
Hobart High School			1		1
HSE Illinois			1		1
Lake Central High School	2				2
Laporte High School			1		1
Lisle High School				1	1
Lowell High School				1	1
Marian Catholic High School	1				1
Marquette Catholic High School			1		1

Michigan City High School		1			1
Morton Senior High School	1				1
Munster High School	1			1	2
R. Nelson Snider High School				1	1
Portage High School			1		1
Grand Total	10	4	8	9	31

The following tables show DFW rates of classes in our department. The data is taken from the UIRR database.



