

Program Assessment Presentation May 15, 2009

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• The Three Student Outcomes

The Department of Mathematical Sciences is in agreement that our graduating students should possess the following three competencies:

- 1. Given initial information and data from various domains, students will be able to identify problems, and using appropriate mathematical tools, formulate and solve them.
- 2. Students will be able to understand, create and analyze mathematical proofs.
- 3. Students will be able to communicate mathematics clearly in oral and written form.



• Students Will Be Assessed In Seven Courses

	BS Math	BS Math SecEd	BS Math Stat	BS Math Act.	BS Applied
DEGREE PLANS					Math
Math 2300 - Discrete					
Mathematics	С	С	С	С	1
Math 2325 - Introduction to					
Higher Mathematics	С	С	С	С	0
Math 3325 - Principles of					
Mathematics	1	1	1	1	0
Math 3341 - Introduction to					
Analysis	1	1	0	1	0
Math 4303 - Fundamental					
Mathematics from an Advanced					
Standpoint	0	1	0	0	0
Math 4329 - Numerical Analysis	е	е	1	1	1
Stat 4380 - Statistics I	е	1	1	1	1

- 1: Required course
- c: Students take Math 2300 or Math 2325
- e: Elective
- 0: Not required



Competency Maps

COURSES	BS Math	BS Math SecEd	BS Math Stat	BS Math Act.	BS Applied
Outcome 1	2300 or 2325	2300 or 2325	2300 or 2325	2300 or 2325	2300
		4303			
	4329*	4329*	4329	4329	4329
	4380*	4380*	4380	4380	4380
Outcome 2	2300 or 2325	2300 or 2325	2300 or 2325	2300 or 2325	2300
	3325	3325	3325	3325	
	3341	3341		3341	
		4303			
Outcome 3	2300 or 2325	2300 or 2325	2300 or 2325	2300 or 2325	2300
	3325	3325	3325	3325	
	3341	3341		3341	
		4303			

bold: major coverage *italic*: minor coverage * elective



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Assessment of Student Outcomes

Outcomes	Where	Tool	When	Who	Analyses	Review	Implementati	
							on	
1	MATH 2300 MATH 2325 MATH 4329 STAT 4380	Final exam questions and/or lab reports	Every spring semester	Course instructor	Ad-hoc course committee, annually after the spring semester	Program Assessment Committee (Guthrie, Knaust) reviews results and presents annual report to the faculty	Program Assessment	Changes approved by the faculty
2	MATH 2300 MATH 2325 MATH 3325 MATH 3341 MATH 4303	Final exam questions and/or lab reports	Every spring semester, except for Math 4303 (fall semester)	Course instructor	Ad-hoc course committee, annually after the spring semester		will be implemented and then field tested in the next year. Not applicable yet.	
3	MATH 2300 MATH 2325 MATH 3325 MATH 3341 MATH 4303	Final exam questions, oral pre- sentation, and/or lab reports	Every spring semester, except for Math 4303 (fall semester)	Course instructor	Ad-hoc course committee, annually after the spring semester			



• Spring 2009: Assessment in Two Courses

Math 2300 - Discrete Mathematics

- two sections per semester
- mostly mathematics and computer science majors
- also offered at EPCC

Math 3341 - Introduction to Analysis

- two sections this semester
- almost exclusively mathematics majors



. Course Goals I: Math 2300 (Discrete Mathematics)

Students are expected to make considerable progress in the following areas:

#	Course Goal	Linked to	Measurement	Benchmark
		Outcome	Method	
1	Students will be able to use the basic	1,2	Final examination	67% correct
	algebra of sets and of logic.		questions	
2	Students will be able to identify and	1,2	Final examination	67% correct
	use common classes of relations		questions	
	(reflexive, symmetric, transitive,			
	antisymmetric; equivalence relations			
	and partial orders).			
3	Students will be able to carry out	1	Final examination	80% correct
	basic computations in modular		questions	
	arithmetic.			

¹¹ A student who scores at least the required percentage on the appropriate questions will have met the benchmark for the respective course 7 goal.



• Course Goals II: Math 2300 (Discrete Mathematics)

Students are expected to make considerable progress in the following areas:

#	Course Goal	Linked to	Measurement	Benchmark
		Outcome	Method	
4	Students will be able to solve counting	1	Final	50% correct
	problems involving combinations and		examination	
	permutations, including counting		questions	
	problems with restrictions, and they will be			
	able to use these skills to compute discrete			
	probability.			
5	Students will know the basic definitions and	1	Final	67% correct
	theorems (such as Euler's theorem) of graph		examination	
	theory, and be able to apply them to specific		questions	
	graphs.			
6	Students will know the basic algorithms for	1	Final	80% correct
	traversing trees, and be able to apply them		examination	
	to specific trees.		questions	
7	Students will be able to use induction to	2	Final	33% correct
	prove simple summations and inequalities		examination	
			questions	



.Course Goals: Math 3341 (Introduction to Analysis)

Students are expected to make considerable progress in the following areas:

#	Course Goal	Linked to Outcome
1	Student will become familiar with the fundamental results of	2
	"Analysis on the Real Line" (highlights of the course include	
	the Intermediate Value Theorem, the Mean Value Theorem	
	and possibly the Fundamental Theorem of Calculus)	
2	Students will thoroughly understand the definitions of the	2
	basic concepts of Analysis such as convergence, continuity,	
	differentiation and integration	
3	Students will be able to apply definitions and theorems in	2
	Analysis	
4	Students will continue to develop their ability to use the	2
	method of proof to establish the fundamental results in	
	Analysis	
5	Students will employ effective strategies to decide the truth	2
	or falsity of mathematical propositions	
6	Students will be able to write down proofs in a clear, concise	3
	manner using correct English and mathematical grammar.	
7	Students will be able to present and defend a proof to a	3
	group of their peers.	



Assessment Procedure: Math 3341 (Introduction to Analysis)

COURSE OBJECTIVES	MEASUREMENT METHOD	BENCHMARK
(Corresponding course goals)		
1. State important	Embedded final examination	80% (4 of 5 correct)
definitions (2)	questions	
2. State major theorems (1)	Embedded final examination	66% (2 of 3 correct)
	questions	
3. Use the definitions to	Embedded final examination	50% (1 of 2 essentially
compute a limit and a	questions	correct)
derivative (2,3)		
4. Show facility with the	Embedded final examination	66% (2 of 3 essentially
following techniques: ε-δ	questions	correct)
proof, counterexample,		
subsequence construction		
(2,3,4,5,6)		
5. Construct and present a	During class time, using	80% on a rubric score
proof to the class (7)	notes, present at the board	(Only minor errors in
	and defend a solution to an	notation or presentation.
	exercise that requires proof.	No errors in logic.)



Assessment Timetable (Spring 2009 - Spring 2010)

• The first round of assessment of the courses has taken place in the Spring semester 2009 with the courses Math 2300 (Discrete Mathematics) and Math 3341 (Introduction to Analysis). Data are being collected by the instructors in each of the class sections of these courses.

• The ad-hoc committees for the two courses will provide the Program Assessment Committee with an analysis of the collected data by the end of June 2009. The Program Assessment Committee will review these reports and present an annual report with recommendations to the faculty at a regularly scheduled faculty meeting in the Fall semester of 2009. Any resulting course, program or assessment modifications will be implemented during the Spring 2010 semester.

• Data will be collected for Math 4303 in Fall 2009, and the remaining courses will be added to the assessment cycle beginning with data collection in the Spring semester of 2010.