

Framingham State University

Program Assessment Plan for Mathematics Major 2023-2028

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Department Chair:	Michael Krul
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1) PROGRAM MISSION STATEMENT

The mission of the Mathematics major is to develop and enhance undergraduate students' abilities in critical thinking, logical reasoning, problem-solving, modeling, and oral and written communication in mathematics. In order to achieve this mission, the mathematics department provides students' opportunities to study analysis, algebra, probability and statistics, number theory, geometry, and the history and applications of mathematics. Students benefit from close working relationships with devoted faculty who draw on a variety of mathematical backgrounds to provide a broad perspective on the mathematical sciences. Graduates of the program will be well-equipped to teach at the middle or high-school level, pursue graduate study in mathematics, statistics, or a related field, or enter a professional career, particularly one requiring strong analytical skills.

2) PROGRAM LEARNING GOALS

1. Students should be able to construct mathematical proofs, making use of correct mathematical terminology and rules of logic, using a variety of proof techniques, including direct and indirect arguments, proof by contradiction, and mathematical induction.
2. Students should be able to solve computational mathematics problems with clear, well-written, and accurate solutions.
3. Students should be able to solve problems using critical thinking by implementing exploratory and/or iterative techniques.
4. (MAT Concentrators) Students should be able to explain middle and/or high school mathematical concepts orally and in writing, using multiple techniques, in a manner appropriate for a middle and/or high school audience.
5. (MAG Concentrators) Students should be able to communicate an advanced mathematical concept clearly and precisely to an audience of peers and faculty.

3) OBJECTIVES

1. Goal 1.
 - (a) Evaluating Definitions, identifying form to fit definition.
 - (b) Applying logical structure to form a successful argument.

2. Goal 2.
 - (a) Performing complex calculations with accuracy and precision.
 - (b) Articulating numerical solutions within appropriate context.

3. Goal 3.
 - (a) Identifying multiple approaches to completing a task.
 - (b) Assimilating information from multiple iterates of a problem-solving technique.

4. Goal 4.
 - (a) Writing clear and thorough solutions.
 - (b) Presenting mathematical concepts clearly and thoroughly.

5. Goal 5.
 - (a) Writing clear and concise proofs or solutions to application scenarios.
 - (b) Presenting advanced mathematical concepts clearly and thoroughly.

4) LEARNING OPPORTUNITIES

Course Number	Course Name	Goal 1 Objective a	Goal 1 Objective b	Goal 2 Objective a	Goal 2 Objective b
MATH 157	Probability and Statistics			<i>I</i>	<i>I</i>
MATH 206	Discrete Math I	<i>I</i>	<i>I</i>		
MATH 219	Calculus I			<i>I</i>	<i>I</i>
MATH 220	Calculus II			<i>R</i>	<i>R</i>
MATH 221	Calculus III			<i>M/A</i>	<i>M/A</i>
MATH 226	Linear Algebra	<i>R</i>	<i>R</i>	<i>M/A</i>	<i>M/A</i>
MATH 317	Higher Geometry (UMAT)	<i>R</i>	<i>R</i>		
MATH 322	History of Math (UMAT)				
MATH 419	Abstract Algebra I	<i>M/A</i>	<i>M/A</i>		
MATH 427	Real Analysis	<i>M/A</i>	<i>M/A</i>		
EDUC 410/411	Student Teaching: H.S. (UMAT)				
EDUC 414/415	Student Teaching: M.S. (UMAT)				

Key: *I* = Introduced; *R* = Reinforced; *M* = Mastered; *A* = Assessed

Course Number	Course Name	Goal 3 Objective a	Goal 3 Objective b	Goal 4 Objective a	Goal 4 Objective b
MATH 157	Probability and Statistics	<i>I</i>		<i>I</i>	<i>I</i>
MATH 206	Discrete Math I			<i>I</i>	<i>I</i>
MATH 219	Calculus I		<i>I</i>	<i>I</i>	<i>I</i>
MATH 220	Calculus II	<i>R</i>	<i>R</i>	<i>R</i>	<i>R</i>
MATH 221	Calculus III		<i>R</i>	<i>R</i>	<i>R</i>
MATH 226	Linear Algebra	<i>R</i>		<i>R</i>	<i>R</i>
MATH 317	Higher Geometry (UMAT)			<i>R</i>	<i>R</i>
MATH 322	History of Math (UMAT)			<i>R</i>	<i>R</i>
MATH 419	Abstract Algebra I	<i>M/A</i>	<i>M/A</i>	<i>R</i>	<i>R</i>
MATH 427	Real Analysis	<i>M/A</i>	<i>M/A</i>	<i>R</i>	<i>R</i>
EDUC 410/411	Student Teaching: H.S. (UMAT)			<i>M/A</i>	<i>M/A</i>
EDUC 414/415	Student Teaching: M.S. (UMAT)			<i>M/A</i>	<i>M/A</i>

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Course Number	Course Name	Goal 5 Objective a	Goal 5 Objective b
MATH 157	Probability and Statistics	<i>I</i>	<i>I</i>
MATH 206	Discrete Math I	<i>I</i>	<i>I</i>
MATH 219	Calculus I	<i>I</i>	<i>I</i>
MATH 220	Calculus II	<i>R</i>	<i>R</i>
MATH 221	Calculus III	<i>R</i>	<i>R</i>
MATH 226	Linear Algebra	<i>R</i>	<i>R</i>
MATH 317	Higher Geometry (UMAT)		
MATH 322	History of Math (UMAT)		
MATH 419	Abstract Algebra I	<i>M/A</i>	<i>M/A</i>
MATH 427	Real Analysis	<i>M/A</i>	<i>M/A</i>
EDUC 410/411	Student Teaching: H.S. (UMAT)		
EDUC 414/415	Student Teaching: M.S. (UMAT)		

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5) ASSESSMENT METHODS AND TIMELINE

Indicate when and how program learning objectives will be assessed. Refer to the curriculum map to draft a student learning objective assessment timeline. It is recommended that you outline a 5-year plan for assessment in which you will assess all of your PLOs.

Academic Years	Goal	Course(s)	Assessment Evidence (direct/indirect)	Assessment Method	Responsibility
WHEN	WHICH Objectives(s) will you examine in each period (Use number)?	WHERE will you look for evidence of student learning (i.e., list course(s) that will generate evidence for each objective.	WHAT student work or other evidence will you examine in order to assess each objective?	HOW will you look at the evidence; what means will you use to analyze the evidence collected for each objective	WHO will oversee collecting, analyzing, reporting, results? List names or titles.
Year 3 (2025-2026)	Goal 1	MATH 419 MATH 427	Exams, problem sets	Rubrics (TBD)	Dept. Assessment Comm. Chair
Year 4 (2026-2027)	Goal 2	MATH 221 MATH 226	Exams, problem sets	Rubrics (TBD)	Dept. Assessment Comm. Chair
Year 5 (2027-2028)	Goal 3	MATH 419 MATH 427	Problem sets	Rubrics (TBD)	Dept. Assessment Comm. Chair

Year 2 (2024-2025)	Goal 4	EDUC 410/411 EDUC 415/416	Oral presentations	CAP, Rubrics (TBD)	Robert Page Chris Staniszewski
Year 1 (2023-2024)	Goal 5	MATH 419 MATH 427	Oral presentations Exams, problem sets	Rubrics (TBD)	Dept. Assessment Comm. Chair

Program Size and Sampling Technique

- a. State the number of students in the program or the number who graduate each year.

As of November 2023, there are a total of 33 mathematics majors spread among the two concentrations.

- b. Describe the sampling technique to be used

For each learning objective, artifacts will be collected from each student completing the course(s) used to assess the learning objective.

6) PLAN FOR ANALYZING RESULTS

- List who is responsible for distributing results and who will receive results?

Chair of the departmental assessment committee will distribute results. All full-time tenured/tenure-track faculty will receive results.

- State how and at which forums discussion of results will take place.

Preliminary discussion will take place during a departmental meeting. More detailed discussion of results will take place during the annual departmental curriculum retreat.

7) **DISTRIBUTION.** The program will distribute or publish these items in the following ways:

<i>ITEM</i>	<i>Distribution Method</i>					
	FSU Catalog (provide section title)	Website (provide URL)	Annual Reports	Brochures	Course Syllabi	Other (please describe, e.g. department meeting, advising session)
Program Mission	X	X www.framingham.edu/mathematics	X			Department meetings, dept. curriculum retreat, advising sessions
Program Learning Objectives		X www.framingham.edu/mathematics	X			Department meetings, dept. curriculum retreat, advising sessions
Learning Opportunities (Curriculum Map)		X www.framingham.edu/mathematics	X			Department meetings, dept. curriculum retreat, advising sessions
Assessment Plan		X www.framingham.edu/mathematics	X			Department meetings, dept. curriculum retreat, advising sessions

Attach any rubrics or instrumentation that you plan to use for assessment of Program Learning Objectives

¹ If you have questions or need assistance, please contact Dr. Mark Nicholas, Director of Assessment at mnicholas1@framingham.edu or 508-626-4670

² Accredited programs can provide supplemental documents that indicate the answers to these questions as long as specific page references are provided in each cell of the tables in this form. When the answers are not accessible in that way, please cut and paste into your assessment plan.

Credits: This Template was developed using ideas from templates developed at University of Rhode Island and University of Hawaii in Manoa.