



SAINT LOUIS
UNIVERSITY

Saint Louis University
Program Assessment Plan

Program (Major, Minor, Core): B.A. Mathematics

Department: Mathematics and Computer Science

College/School: Arts and Sciences

Person(s) Responsible for Implementing the Plan: Chair of departmental assessment committee (Currently Mike May)

Date Submitted: 12/6/2015

Program Learning Outcomes	Curriculum Mapping	Assessment Methods	Use of Assessment Data
<i>What do you expect all students who complete the program to know, or be able to do?</i>	<i>Where is the outcome learned/assessed (courses, internships, student teaching, clinical, etc.)?</i>	<i>How do students demonstrate their performance of the program learning outcomes? How does the program measure student performance? Distinguish your direct measures from indirect measures.</i>	<i>How does the program use assessment results to recognize success and "close the loop" to inform additional program improvement? How/when is this data shared, and with whom?</i>

<p>1. <i>Demonstrate the ability to solve a variety of mathematical problems</i></p>	<p>Level 1*: Math 1510, 1520, 2530, 2660, 3120, 4110, 4120, 4150, Math stats, Math Sequence, 3000+</p> <p>Level 2*: Math 1510, 1520, 2530, 2660, 3120, 4110, 4120, 4150, Math stats, Math Sequence, 3000+</p> <p>Level 3*: Math 1520, 2530, 2660, 3120, 4110, 4120, 4150, Math stats, Math Sequence, 3000+</p>	<p>Direct Measures: Homework, Test and Exam item analysis of basic and advanced problem solving in the calculus sequence (Math 1510, 1520, 2530) and in representative courses beyond calculus, namely Math 2660, Math 3120, Math 3550, Math 4110, Math 4120, Math 4150, Math 4210, Math 4220, Math 4230, Math 4310, Math 4320, Math 4550, Math 4570, Math 4810, and Math 4820</p> <p>Analysis of the rates of successful completion of problems in the online homework system used in the calculus sequence (Math 1510, 1520, 2530)</p> <p>Indirect Measures: Exit survey</p>	<p><i>Homework, test and exam items will be analyzed periodically (see note below table) against expected standards of performance by the department assessment committee;</i></p> <p><i>recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on a regular cycle that allows for appropriate implementation.</i></p> <p><i>Exit survey responses will be monitored to identify areas that need further detailed attention.</i></p> <p><i>Reviews of the impact of any such program changes will also be conducted periodically (see note below table), and the records of those reviews will be maintained by our department assessment coordinator.</i></p>
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<p>2. <i>Demonstrate an ability to recall important mathematical definitions and results (for example, theorems)</i></p>	<p>Level 1*: Math 1510, 1520, 2530, 2660, 3120, 4110, 4120, 4150, Math stats, Math Sequence, 3000+</p> <p>Level 2*: Math 1510, 1520, 2530, 2660, 3120, 4110, 4120, 4150, Math stats, Math Sequence, 3000+</p>	<p>Direct Measures:</p> <p>Test and Exam item analysis of basic and advanced problem solving in the calculus sequence (Math 1510, 1520, 2530) and in representative courses beyond calculus, namely Math 2660, Math 3120, Math 3550, Math 4110, Math 4120, Math 4150, Math 4210, Math 4220, Math 4230, Math 4310, Math 4320, Math 4550, Math 4570, Math 4810, and Math 4820</p> <p>Indirect Measures: Exit survey</p>	<p><i>Test and exam items will be analyzed periodically (see note below table) against expected standards of performance by the department assessment committee; recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on a regular cycle that allows for appropriate implementation.</i></p> <p><i>Exit survey responses will be monitored to identify areas that need further detailed attention.</i></p> <p><i>Reviews of the impact of any such program changes will also be conducted periodically (see note below table), and the records of those reviews will be maintained our department assessment coordinator.</i></p>
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<p>3. <i>Demonstrate an ability to apply mathematical reasoning, including formulating definitions.</i></p>	<p>Level 2*: Math 2660, 3120</p> <p>Level 3*: Math 2660, 3120</p>	<p>Direct Measures: Homework, Test and Exam item analysis in Math 2660 (Principles of Mathematics) and Math 3120 (Introduction to Linear Algebra)</p> <p>Indirect Measures: Exit survey</p>	<p><i>Homework, test and exam items will be analyzed periodically (see note below table) against expected standards of performance by the department assessment committee; recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on a regular cycle that allows for appropriate implementation.</i></p> <p><i>Exit survey responses will be monitored to identify areas that need further detailed attention.</i></p> <p><i>Reviews of the impact of any such program changes will also be conducted periodically (see note below table), and the records of those reviews will be maintained by our department assessment coordinator.</i></p>
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<p>4. <i>Demonstrate an ability to apply the methods of direct and indirect proof.</i></p>	<p>Level 2*: Math 2660, 3120, 4110, 4120, 4150, Math Sequence, 3000+</p> <p>Level 3*: Math 2660, 3120, 4110, 4120, 4150, Math Sequence, 3000+</p>	<p>Direct Measures: Homework, Test and Exam item analysis in Math 2660 (Principles of Mathematics) and theoretical upper division courses, particularly Math 3120 (Introduction to Linear Algebra), Math 4110 (Introduction to Abstract Algebra), 4120/4150 (Linear Algebra/Number Theory), 4210 (Introduction to Analysis), 4220/4230 (Metric Spaces/Multivariable Analysis)</p> <p>Indirect Measures: Exit survey</p>	<p><i>Homework, test and exam items will be analyzed periodically (see note below table) against expected standards of performance by the department assessment committee; recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on a regular cycle that allows for appropriate implementation.</i></p> <p><i>Exit survey responses will be monitored to identify areas that need further detailed attention.</i></p> <p><i>Reviews of the impact of any such program changes will also be conducted periodically (see note below table), and the records of those reviews will be maintained by our department assessment coordinator.</i></p>
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5. <i>Demonstrate an ability to communicate mathematical ideas and concepts clearly in written problem solutions</i>	<p>Level 2*: Math 1510, 1520, 2530, CSCI 1xxx</p> <p>Level 3*: Math 1510, 1520, 2530, 2660, 3120, 4110, 4120, Math stats, Math Sequence, 300+, CSCI 1xxx</p>	<p>Direct Measures: Homework, Test and Exam item analysis in a representative course such as Math 2660 Principles of Mathematics</p> <p>Indirect Measures: Exit Survey</p>	<p><i>Homework, test, and exam items will be analyzed periodically (see note below table) against expected standards of performance by the department assessment committee; recommendations for curriculum, pedagogy and/or assessment revisions will be made to the department faculty on a regular cycle that allows for appropriate implementation.</i></p> <p><i>Exit survey responses will be monitored to identify areas that need further detailed attention.</i></p> <p><i>Reviews of the impact of any such program changes will also be conducted periodically (see note below table), and the records of those reviews will be maintained by our department assessment coordinator.</i></p>
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Curriculum Mapping Notes* (Adapted from Bloom's Taxonomy (1965))

Level I	Level II	Level III
<ul style="list-style-type: none"> ▪ <i>Knowledge & Comprehension:</i> Recall data or information; understand the meaning, translation, interpolations, and interpretation of instructions and problems; state a problem in one's own words. 	<ul style="list-style-type: none"> ▪ <i>Application:</i> Use a concept in new situations; unprompted use of an abstraction. Application of knowledge in novel situations. ▪ <i>Analysis:</i> Separates material or concepts into component parts so organizational structure may be understood. Distinguishes facts from inferences. 	<ul style="list-style-type: none"> ▪ <i>Synthesis:</i> Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. ▪ <i>Evaluation:</i> Make judgments about the value of ideas or materials.

1. It is **not recommended** to try and assess (in depth) all of the program learning outcomes every semester. It is best practice to plan out when each outcome will be assessed and focus on 1 or 2 each semester/academic year. Describe the responsibilities, timeline, and the process for implementing this assessment plan.

The department has a standing assessment committee. The plan will be managed by the chair of the departmental assessment committee. The committee will meet at least once a semester to review the process and make needed minor adjustments. Significant revisions in the plan will be brought to the department for approval.

The associate chair will continue to conduct exit interviews as part of the students fulfilling the MATH 495 requirement. This has been department policy for several years.

A significant amount of the program assessment involves mining and mapping data that is gathered as part of course assessment. The department is working on a method for routine sharing of course materials and course assessment results under the guidance of a course captain. This will give some structure to the informal process by which courses are managed by a collegial committee of the faculty teaching the course over a period of time. The assessment committee is working on a process where all courses will assess one course objective each year with objectives chosen to support program assessment. A pilot project involving 6 courses spread throughout the curriculum to look at the issues in each type of course is planned for the spring semester.

The initial process has resulted in a proposal for revision/updating of a number of courses. This proposal is working its way through the normal approval process.

2. Please explain how these assessment efforts are coordinated with Madrid (courses and/or program)?

Discussions are underway to bring Madrid into the system. Requests have been made to give their faculty access to the shared data we are gathering. (Courses are offered at Madrid that count for the major but are rarely taken by declared majors.)

We anticipate bringing professional studies into the process in about a year after we have completed the pilot proposals. (It should be noted that professional studies does not offer courses that formally count for the major.)

3. The program assessment plan should be developed and approved by all faculty in the department. In addition, the program assessment plan should be developed to include student input and external sources (e.g., national standards, advisory boards, employers, alumni, etc.). Describe the process through which your academic unit created this assessment plan. Include the following:

- a. Timeline regarding when or how often this plan will be reviewed and revised. (This could be aligned with program review.)

The assessment committee of the department will review the plan at least once per year, making minor adjustments. Major adjustments to the plan will be made by the department. The department will review the plan at least once every three years.

- b. How students were included in the process and/or how student input was gathered and incorporated into the assessment plan.

The department has been doing exit interviews for several years. The results are part of the process of constructing this plan.

- c. What external sources were consulted in the development of this assessment plan?

This plan is based on the assessment plan that was submitted to and approved by UAAC when the BS degree was proposed. It was created in consultation with the university assessment coordinator after looking at assessment plans at other institutions.

- d. Assessment of the manageability of the plan in relation to departmental resources and personnel.

Most of the work of the plan is a formalization of the normal oversight that has traditionally been done by hallway conversation. The formalization of assessment will add work to the load of every faculty member and will correspondingly cut into the time they have available for their teaching and research duties.