

Assessing Student Outcomes – 2004-05

Program name:

Department of Mathematical Sciences

Report prepared by:

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Who is the current Assessment contact for your department?

Yu Song, Chair

Should assessment information be sent to anyone else in your department?

No

1. What specific educational goals does your program have for its students?

The major goal of our program is to give students seeking degrees in mathematics a broad understanding of the field of mathematics.

- Students should have the ability to read and understand technical mathematical writing, including proofs, in such areas as algebra and analysis.
- Students should have the ability to communicate mathematical ideas, both in written and verbal form, to others.
- Students should be able to model complex problem situations in equivalent mathematical form and, once a solution is found, be able to translate the solution into the original problem context.
- Students should be able to use appropriate technology to explore and solve mathematical problems.
- Students should be able to apply mathematical knowledge in non-academic contexts.

2. What assessment techniques did your program use to measure the attainment of these goals in the last academic year? (e.g. pre and post testing, portfolios, juried performances, etc.) What were the results of these assessment measures?

The Department of Mathematical Sciences uses several methods to assess students of mathematics. A major instrument of assessment is the use of student portfolios, containing representative work from all 400 level Mathematics courses taken by a student. Depending on the desires of the instructor, the representative work may include such items as final examinations, homework assignments, projects, papers, etc. Student research projects are also included in their portfolios.

Two surveys are also chief instruments of assessment. A survey of current students was conducted in the Fall of 2004. A copy of the form used and summary of the results of this survey appear later in this report. A survey of

alumni is taken every third year; the last such survey was done in Fall 2002, so this survey was not conducted during the current academic year.

Other components of our assessment plan include records of student applications to graduate schools, and student performances on the Putnam and other competitive examinations such as the Indiana College Mathematics Competition.

3. How did these techniques help the department measure student learning and achievement? Please be explicit about how data collected objectively measure student outcomes. How does the data measure whether students understand the important concepts of a discipline?

Samples of students' solutions to homework assignments, final examinations, research projects and other written material can be used to measure the students' ability to read and understand technical mathematical writing, including proofs, in such areas as algebra and analysis. Such written documentation also can be used to assess the ability to communicate mathematical ideas in written form.

Appropriately designed assignments, projects or examination problems measure the ability to model complex problem situations in equivalent mathematical form and the ability to translate the solution into the original problem context.

Similarly, such assignments, projects or examination problems can be used to determine whether the students are able to use appropriate technology to explore and solve mathematical problems. Work related to mathematical modeling can be used to measure the students' ability to apply mathematical knowledge in non-academic contexts.

A team from IU South Bend placed 5th out of a group of 36 teams in the 2005 Indiana College Mathematics Competition held in Fort Wayne. This competition is organized by the Mathematical Association of America, and this year consisted of 8 challenging mathematics problems. Teams of three students worked cooperatively on the problems for 3 hours. The success of the team in this competition demonstrates the ability of the team members to interpret difficult mathematical problems, their ability to communicate mathematical ideas verbally and in written form during the solution process, and their ability to communicate their final solutions in written form.

4. For which goals did your students learn at or beyond your expectations? Which areas need improvement?

The students' ability to read and understand some technical mathematical writing, and to communicate some mathematical ideas, both in written and verbal form, to others was found to meet our expectations. The students' ability to model complex problem situations in equivalent mathematical form and, once a solution is found, their ability to translate the solution into the original problem context met our expectations. The ability of the students to use appropriate technology to explore and solve mathematical problems and to apply mathematical knowledge in non-academic contexts met our expectations.

- 5. How were the results of your assessment program analyzed and recorded?**
a. How was department faculty involved?

Those faculty members teaching 400-level courses added to the student portfolios such materials as final examinations, homework assignments, projects, papers, and research projects. In addition, faculty teaching upper-level courses distributed and collected the current student survey forms in Fall, 2004.

- b. How were students involved?**

This year students enrolled in upper level mathematics courses were involved in the assessment process by participating in the current student survey. Students in 400-level courses were also involved insofar as materials from their course were collected and placed in their portfolios.

- c. How were records kept?**

The student portfolios as well as the completed student survey forms are kept in the department office, NS301, and are maintained by the department secretary.

- 6. The Higher Learning Commission points out the obvious but important concept that Assessment cannot be static. In order to achieve excellence, assessment must be viewed with a constancy of purpose requiring never ending activity and revision.**

-Were any changes made this year in the assessment plan or the assessment techniques used by your department?

-How does your assessment plan tie into your department's strategic planning? - How were these decisions made?

No changes to the assessment plan were made during the 2004-2005 academic year as of the date of this report.

The activities described in the department's assessment plan give the department valuable feedback from our students in the form of student surveys and materials gathered from upper-level courses. The department uses this information when reviewing its programs and curriculum.

The department meets annually to discuss the information gathered through assessment activities. At this meeting the department considers changes to its programs and curriculum and other issues raised by the assessment data.

- 7. The Higher Learning Commission emphasizes that assessment must be used to improve academic operations and to achieve measurable improvements in student learning outcomes.**

- Were any changes made to your curriculum as a result of assessing your students?**
- Do you anticipate making any program changes in the future as a result of your assessment activities?**
- What is the rationale for these changes?**
- How are your assessment results tied to your budget or budget requests?**

T436 was offered for the first time during the 2004-2005 academic year. This course emphasizes developing a deeper understanding of secondary mathematics by examining its fundamental ideas from an advanced perspective. Topics are selected from real and complex number systems, functions, equations, integers, polynomials, congruence, distance and similarity, area and volume, and trigonometry.

The department continues to review and improve its programs. The assessment activities form part of the review process, have been used in the past, and will continue to be used in the future to guide our program modification and development.

Mathematics Student Survey 2004-2005

(To Students: Please fill out this survey at most once per school year.)

A. What is your major?	C. What are your career plans?
B. Which mathematics course(s) are you taking this semester?	

D. Please circle the appropriate response in each case.

The courses I have taken in mathematics at IUSB enable me to

1. read and understand mathematical writing.

strongly agree agree neutral disagree strongly disagree no opinion

2. communicate mathematical ideas, both in written and oral form.

strongly agree agree neutral disagree strongly disagree no opinion

3. model problems in mathematical form, solve the problems, and translate the solution back to the context of the original problem.

strongly agree agree neutral disagree strongly disagree no opinion

4. use appropriate technology to explore and solve mathematical problems.

strongly agree agree neutral disagree strongly disagree no opinion

E. What are the best aspects of your experience with the Mathematics program at IUSB?

F. Do you have any suggestions for improving the Mathematics program at IUSB? For example, are there any new courses and/or topics that you would like to see offered?

**Mathematics Student Survey Results
Fall, 2004**

A total of 52 surveys were completed and returned. The responses to the questions in sections D, E and F are summarized below.

D. The courses I have taken in mathematics at IUSB enable me to:

1. read and understand mathematical writing.

strongly agree	agree	neutral	disagree	strongly disagree	no opinion
16	30	5	1	0	0
30.8%	57.7%	9.6%	1.9%	0%	0%

2. communicate mathematical ideas, both in written and oral form.

strongly agree	agree	neutral	disagree	strongly disagree	no opinion
9	32	10	1	0	0
17.3%	61.5%	19.2%	1.9%	0%	0%

3. model problems in mathematical form, solve the problems, and translate the solution back to the context of the original problem.

strongly agree	agree	neutral	disagree	strongly disagree	no opinion
12	26	13	1	0	0
23.1%	50.0%	25.0%	1.9%	0%	0%

4. use appropriate technology to explore and solve mathematical problems.

strongly agree	agree	neutral	disagree	strongly disagree	no opinion
11	22	16	2	0	1
21.2%	42.3%	30.8%	3.9%	0%	1.9%

E. What are the best aspects of your experience with the Mathematics program at IUSB?

The majority of the responses to this question mention the faculty in one way or another. A selection of responses of this type appears below.

"Enthusiastic professors who seem to enjoy teaching."

"I have gotten to know all the professors and their interests push me in my search of knowledge."

"Teachers are interesting and make the class fun."

"The professors are by far the best experience. We have some very helpful and knowledgeable professors."

"The professors have all been great in their teachings & understanding of the students."

"Very approachable and helpful professors, detailed teaching."

F. Do you have suggestions for improving the Mathematics program at IUSB? For example, are there any new courses and/or topics that you would like to see offered?

The most frequent response to this question suggested either increasing the frequency of or type of course offerings. Responses of this type included the following.

"More course options in general."

"More varied graduate courses: Number Theory, Discrete Math, Topology, Linear Algebra."

"Offer classes more often."

"Offer more summer school upper level classes, I.e. M260-M261 or M311."

"Try and offer the upper level math class more often."