

Department of Mathematical Sciences
Third Year Program Assessment

March 28, 2006

Assessment contact person, and person preparing the report, (if different):

Yu Song
Dean Alvis

Attach 2004, 2005 and 2006 annual reports

These reports appear in Appendices 1, 2 and 3.

Attach an updated departmental assessment plan

The current plan appears in Appendix 4.

Describe any changes to the program's educational goals since the last Third Year Review, and the rationale for those changes.

No changes have been made to the educational goals since the last Third Year Review.

Describe any assessment techniques used for measuring the Educational Goals that have been added or discontinued since the last Third Year Review, and the rationale for those changes

No technique has been added or discontinued since the last Third Year Review.

Attach any assessment instruments that have been used during the past three years, and the data collected, (or, summarized data, if that is more appropriate.)

The Current Student Survey appears as part of Appendix 2, Report for 2004-2005, as well as a summary of the results. The Alumni Survey appears as part of Appendix 3, Report for 2005-2006, along with a summary of the results.

What analysis has been done with this data? What conclusions has your department drawn? What changes have been made to the program as a result? (Curriculum, classes offered, classes discontinued, scheduling, advising, faculty education etc. . .) How did assessment data and analysis support these changes?

The Department of Mathematical Sciences meets annually, usually in its last meeting of the spring semester, to analyze the assessment information collected. Changes to the department's degree programs, including curriculum and scheduling of courses, are considered in light of the accumulated assessment data. Further, the assessment plan itself is discussed and, if necessary, revised at this meeting.

In the 2003-2004 review period, the department decided to increase the coverage of proof techniques in M347, Discrete Mathematics, after reviewing assessment data. Also, as a result of previous assessment reviews, T436, Secondary Mathematics for Teachers: An

Advanced Perspective, 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. In the 2005-2006 review period, alumni survey data indicated the need for an additional faculty member to design and teach mathematics education courses and other upper level courses. The needs identified by this survey are consistent with those identified in our position requests and five-year plan.

What changes does the department plan to make in the coming years to the program and to assessment techniques, and why?

The department will revise its Current Student Survey to include a question directly tied to the educational goals listed in its assessment plan, thus making it easier to relate the results of the survey to the goals. The department may also develop a rubric to help quantify the data in student portfolios.

How were faculty, students, administration, alumni and other groups involved in assessment?

All full-time members of the department participate in the analysis and discussion of assessment data, as well as the revision of the assessment plan. Student surveys are structured in such a way that students are not just objects of assessment but are given the opportunity to suggest changes to the curriculum or degree programs. As noted above, alumni as well as current students are involved in the assessment process.

How were assessment data and results shared with faculty, students, administration and alumni?

In addition to submitting this report to the Campus Assessment Committee and the Dean of the College of Liberal Arts and Sciences, copies of the assessment plan, survey data, and reports have been placed on the departmental web page in a downloadable electronic format.

In one paragraph, please summarize the most important impacts of the assessment of student learning on the program.

Assessment of student learning is an important part of the department's regular review of its programs and curriculum. Assessment activities led the department to introduce recent changes, such as the increased emphasis on proofs in M347, Discrete Mathematics, and the introduction of T436, Secondary Mathematics for Teachers. Assessment reviews also drew attention to the need for an additional faculty member to design and teach mathematics education courses, and the need for strengthening prerequisites in certain courses.

Is there any other information that you would like included in this report?

No.

Appendix 1: Report for 2003-2004

Program name:

Department of Mathematical Sciences

Report prepared by:

Dean Alvis

Who is the current Assessment contact for your department?

Yu Song, Chair

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

No

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.

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. Every third year, a survey is taken of current students majoring in mathematics or secondary mathematics education; the last such survey was done in Fall 2001. A survey of alumni is also taken every third year; the last such survey was done in Fall 2002. Thus neither survey was scheduled to be administered during the 2003-2004 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.

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.

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 be satisfactory. However, it was determined that their ability to read and understand proofs could be improved. 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.

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.

b. How were students involved?

This year the students were involved in the assessment process only insofar as materials from their 400-level courses were collected and placed in their portfolios. Not student surveys were scheduled to be administered during the 2003-2004 academic year.

c. How were records kept?

The student portfolios are kept in the department office, NS301, and are maintained by the department secretary.

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 2003-2004 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.

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?

The department considered the need for improving the students' ability to read and understand proofs, and decided to increase the coverage of proof techniques in M347, Discrete Mathematics. 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.

Appendix 2. Report for 2004-2005

Assessing Student Outcomes – 2004-05

Program name:

Department of Mathematical Sciences

Report prepared by:

Dean Alvis

Who is the current Assessment contact for your department?

Yu Song, Chair

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

No

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.

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.

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.

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.

**How were the results of your assessment program analyzed and recorded?
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.

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.

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.

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.

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.					
<u>The courses I have taken in mathematics at IUSB enable me to</u>					
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."

Appendix 3. Report for 2005-2006

Assessing Student Outcomes – 2005-06

Program name:

Department of Mathematical Sciences

Report prepared by:

Dean Alvis

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 alumni was conducted in the Fall of 2005. A copy of the form used and summary of the results of this survey appear later in this report. A survey of current students is taken every third year; the next such survey will be done in Fall 2007.

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.

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, an alumni survey was sent to students who graduated in the last ten years.

b. How were students involved?

This year former students were involved by taking the alumni 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 alumni 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 2005-2006 academic year as of the date of this report. However, the alumni survey form was redesigned to include a question directly tied to the learning goals listed in the department's assessment plan. (See Question 2 in the Alumni Survey below.)

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?

The department will focus increased attention on the need for an additional faculty member to design and teach mathematics education courses and other upper level courses. The needs identified by the alumni survey are consistent with those identified in our position requests and five-year plan. It should be noted that the topics "Biostatistics" and "Econometrics" mentioned in some student surveys are now being offered. After discussing student performance in upper level courses, the department decided to strengthen the prerequisites for certain mathematics courses. As a first step, students entering courses requiring M107 College Algebra will be required to achieve a grade of C- or better in M107.

IUSB Mathematical Sciences Department Post-Graduation Survey

1. What degree did you earn at IUSB?

2. How well did you achieve each of the following departmental learning goals?

	extremely well	very well	adequately	not very well	not at all
(a) Ability to read and understand technical mathematical writing, including proofs, in such areas as algebra and analysis.					
(b) Ability to communicate mathematical ideas, both in written and verbal form.					
(c) Ability to model complex problem situations in equivalent mathematical form and, once a solution is found, translate the solution into the original context.					
(d) Ability to use appropriate technology to explore and solve mathematical problems.					
(e) Ability to apply mathematical knowledge in non-academic contexts.					

3. Do you use mathematics in your current job and/or graduate school program? If so, were you adequately prepared to learn any additional mathematics required for your current position?

4. Evaluate the level of quality of mathematics courses at IUSB.

5. Are there mathematics courses and/or topics that you wish had been offered while you were at IUSB? If so, please list them below.

6. What were the best aspects of your experience with the Mathematical Sciences department?

7. Are there any suggestions you have for improving the mathematics program at IUSB?

Mathematics Alumni Survey Results Fall, 2005

A total of 15 surveys were completed and returned. The responses to the questions 2-7 are summarized below. Names of specific students or faculty members have been removed.

2. How well did you achieve each of the following departmental learning goals?

(a) Ability to read and understand technical mathematical writing, including proofs, in such areas as algebra and analysis.

extremely well	very well	adequately	not very well	not at all
5	4	4	1	1
33.3%	26.7%	26.7%	6.7%	6.7%

(b) Ability to communicate mathematical ideas, both in written and verbal form.

extremely well	very well	adequately	not very well	not at all
5	7	2	0	1
33.3%	46.7%	13.3%	0.0%	6.7%

(c) Ability to model complex problem situations in equivalent mathematical form and, once a solution is found, translate the solution into the original context.

extremely well	very well	adequately	not very well	not at all
4	7	3	0	1
26.7%	46.7%	20.0%	0.0%	6.7%

(d) Ability to use appropriate technology to explore and solve mathematical problems.

extremely well	very well	adequately	not very well	not at all
2	7	4	1	1
13.3%	46.7%	26.7%	6.7%	6.7%

(e) Ability to apply mathematical knowledge in non-academic contexts.

extremely well	very well	adequately	not very well	not at all
4	9	2	0	0
26.7%	60.0%	13.3%	0.0%	0.0%

3. Do you use mathematics in your current job and/or graduate school program? If so, were you adequately prepared to learn any additional mathematics required for your current position?

While almost all respondents do use mathematics in their current job and/or graduate school program, the level of such mathematics varied widely. All respondents answering the second question felt they were adequately prepared to learn additional mathematics required in their current position. Typical responses are listed below.

"I do use some math in the process of completing my PhD dissertation on dynamical systems applied to networks of inhibitory neurons. I was more than adequately prepared for graduate school in mathematics."

"Job - not too much, mainly algebra. Further education - yes and yes."

"Yes - in the math Master's program at IUSB. My courses in statistics as an undergrad prepared me well."

"Yes, as it stands, yes, I had adequate training to learn my field's mathematical techniques."

"Yes, I was prepared."

4. Evaluate the level of quality of mathematics courses at IUSB.

All responses were positive. Typical responses are listed below.

"Awesome!"

"Good - great teachers."

"I did not major in math but took only basic, required classes. They were sufficient to my needs but were well taught and a pleasure to attend."

"IUSB has excellently taught & structured math courses. I've seen few that compare."

"The highest level of quality is sought & obtained."

"Very good."

5. Are there mathematics courses and/or topics that you wish had been offered while you were at IUSB? If so, please list them below.

All responses that indicated desired courses and/or topics are listed below.

"Biostatistics"

"Econometrics"

"How to teach middleschool math."

"Perhaps there could have been a course taught in conjunction with the physics program on mathematical methods. However, such a course would likely be under the mantle of the physics dept. (and their responsibility)."

"Yes, I wish there were more applicable courses for math in teaching for the graduate program. A 500+ level course is not usable in a high school, and after teaching for 12 years, I will struggle to get my credits in my major."

6. What were the best aspects of your experience with the Mathematical Sciences department?

Responses included the following.

"Calculus. I was never very good in mathematics, but my time at IUSB taught me enough to learn & appreciate higher math."

"I really enjoyed my professor, although I don't remember his name."

"The camaraderie in the department."

"The interaction with the professors. They are all available to help."

"The teachers were available & very helpful."

"Working on class/research projects."

7. Are there any suggestions you have for improving the mathematics program at IUSB?

A wide variety of responses were received, including the following.

"As a mathematics teacher in the State of Michigan I need 6 credit hours every 5 years to keep my license current. I would be great if IUSB could offer a 1 cr hr intense Saturday class, or a 3 cr hr week of class in the summer, for teachers."

"It has been nearly six years since I graduated and so I do not have any suggestions at this time."

"More use of computer software for certain courses. This is one area in which I lack experience though it would be useful in many jobs involving mathematics."

"Offer more graduate level math classes for educators that aid in teaching. Also I have taken courses at a couple other colleges and they seem more concerned about the students. There is more one on one attention."

"You all seem to be heading in the right direction. Well, undergrad recruiting, but you already knew that."

Appendix 4.

Department of Mathematical Sciences Degree Program Assessment Plan

I. Goals

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.

II. Methodology

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. Every third year, a survey is taken of current students majoring in mathematics or secondary mathematics education. The current student survey takes place in the fall of years divisible by three, such as 2001, 2004, etc. The alumni survey takes place the year after the current student survey.

Other components of our assessment plan include records of student applications to graduate schools, and student performances on the Putnam and other competitive examinations.

III. Process

The Department of Mathematical Sciences meets annually, usually in its last meeting of the spring semester, to analyze the assessment information collected. Changes to the department's degree programs, including curriculum and scheduling of courses, are considered in light of the accumulated assessment data. Further, the assessment plan itself is discussed and, if necessary, revised at this meeting.

IV. Participation

All full-time members of the department participate in the analysis and discussion of assessment data, as well as the revision of the assessment plan. Student surveys are structured in such a way that students are not just objects of assessment but are given the opportunity to suggest changes to the curriculum or

degree programs. As noted above, alumni as well as current students are involved in the assessment process.

V. Records

The Department of Mathematical Sciences will keep an archive of student portfolios, student surveys, any other assessment data collected, copies of all assessment reports, and copies of its assessment plan on file in the department office. Copies of the assessment plan and reports will be placed on the departmental web page in a downloadable electronic format.