

Degree Program Name: BS in Mathematics

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Before you complete the form below, review your outcomes library and curriculum map to ensure that they are accurate and up to date. If not, you may submit a new version along with this summary.

**Part One**

<p>a. What learning outcomes did you assess this year?</p> <p>If this is a graduate program, indicate the <a href="#">Graduate Student Learning Outcome</a>* each outcome aligns with.</p>	<p>b. (1) What method(s) did you use to determine how well your students attained the outcome? (2) In what course or other required experience did the assessment occur?</p>	<p>c. What expectations did you establish for achievement of the outcome?</p>	<p>d. What were the actual results?</p>	<p>e. (1) Who was responsible for collecting and analyzing the results? (2) How were they shared with the program's faculty?</p>
<p><b>Objective 1: Students will learn to use and construct logical arguments.</b> <u>Outcome 1.1</u> Student will construct direct proofs.</p>	<p>(1) Samples from Assignments and Test to demonstrate the students understanding of the direct proof  (2) Math 380 class.</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>The students that turn in their assignments show that their proof is correct.</p>	<p>Dr. Brown in Spring 2015, Dr Ko in Fall 2015, and Dr. Johnson in Spring 2016 turn in the copies of the student works to the mathematics department office.</p>
<p><b>Objective 1: Students will learn to use and construct logical arguments.</b> <u>Outcome 1.2</u> Students will construct proofs by contradiction.</p>	<p>(1) Problem on Homework or Quiz or Exam.  (2) Math 380 class.</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>Most students get it correct on proofs by contradiction</p>	<p>Dr. Brown in Spring 2015, Dr Ko in Fall 2015, and Dr. Johnson in Spring 2016 turn in the copies of the student works to the mathematics department office.</p>
<p><b>Objective 1: Students will learn to use and construct logical arguments.</b> <u>Outcome 1.3</u> Students will construct proofs by induction.</p>	<p>(1) Problem on Homework or Quiz or Exam.  (2) Math 380 class.</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>Most Students get it correct on proofs by Induction</p>	<p>Dr. Brown in Spring 2015, Dr Ko in Fall 2015, and Dr. Johnson in Spring 2016 turn in the copies of the student works to the mathematics department office.</p>

<p><b>Objective 1:</b> Students will learn to use and construct logical arguments.  <u>Outcome 1.4</u>  Students will construct examples and counterexamples.</p>	<p>(1) Problem on Homework or Quiz or Exam.  (2) Math 380 class.</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>Most of the students who turn in their paper get it correct.</p>	<p>Dr. Brown in Spring 2015, Dr Ko in Fall 2015, and Dr. Johnson in Spring 2016 turn in the copies of the student works to the mathematics department office.</p>
<p><b>Objective 2:</b> Students will communicate mathematics effectively.  <u>Outcome 2.1:</u> Students will produce a proof involving limits.</p>	<p>(1) Problems on Exam 2.  (2) Math 410 class</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>Out of 10 students that turn in exam paper. The average is 71.6 out of 100.</p>	<p>Dr. Zhao in Fall 2015 turn in the copies of the exam 2 to the mathematics department office</p>
<p><b>Objective 2:</b> Students will communicate mathematics effectively.  <u>Outcome 2.2:</u> Students will produce a proof involving algebraic structures.</p>	<p>(1) Problem on Homework.  (2) Math 412 class</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>Most paper shows correct result.</p>	<p>Dr. Frost in Fall 2015 turn in the copies of the homework to the mathematics department office</p>
<p><b>Objective 2:</b> Students will communicate mathematics effectively.  <u>Outcome 2.3:</u> Students will somehow apply mathematics in an applied problem.</p>	<p>(1) Problem on Homework or Quiz or Exam  (2) Math 413 class</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>No result</p>	<p>Dr. Oberste-Vorth taught in Spring 2015 and Dr. Zhao in Spring 2016 did not report the final result.</p>
<p><b>Objective 2:</b> Students will communicate mathematics effectively.  <u>Outcome 2.4:</u> Students will solve a real-world problem and explain their solution.</p>	<p>(1) Problem on Homework or Quiz or Exam  (2) Math 231 class</p>	<p>Target: 70<sup>th</sup> percent of the students completing the course will be assessed by the committee as meeting or exceeding expectation.</p>	<p>No result</p>	<p>Dr. Johnson Spring 2015, Dr Roberts Fall 2016, and Dr. Zhang Spring 2016 did not report any finding.</p>

<p><b>Objective 3:</b> Students will demonstrate that they are ready to use their mathematical skills in a post-baccalaureate position.</p> <p><b>Outcome 3.1:</b> Students will demonstrate mastery of undergraduate mathematics that will allow them to pursue graduate studies in the mathematical sciences.</p>	<p><b>Measure:</b> ETS Major Field Test—standardized exam taken in students’ final spring or fall semester</p> <p>(1) Math 494</p>	<p><b>Target:</b> 70% of the students completing and passing will be assessed as meeting or exceeding expectations (at least 40<sup>th</sup> percentile but less than 70<sup>th</sup> percentile) or exceed expectations (at least 70<sup>th</sup> percentile)</p>	<p>No Result.</p>	<p>The mathematics department will teach Math 494 class in 2017.</p>
<p><b>Objective 3:</b> Students will demonstrate that they are ready to use their mathematical skills in a post-baccalaureate position.</p> <p><b>Outcome 3.2:</b> Students will demonstrate mastery of mathematics and related content that will allow them to pursue careers utilizing their knowledge.</p>	<p><b>Measure:</b> post-calculus grade point average in mathematics and related minors or second majors</p>	<p><b>Target:</b> 70% of the graduating students will meet expectations (at least 3.00 but less than 3.75) or exceed expectations (at least 3.75)</p>	<p>No Result.</p>	

\* See <https://www2.indstate.edu/graduate/forms/review.pdf>.

*If you would like to report on more than three outcomes, place the cursor in the last cell on the right and hit “tab” to add a new row.*

#### Notes

- a. Use your outcomes library as a reference.
- b. Each outcome must be assessed by at least one direct measure (project, practica, exam, performance, etc.). If students are required to pass an examination to practice in the field, this exam must be included as one of the measures. At least one of the outcomes must use an indirect measure (exit interview, focus group, survey, etc.). Use your curriculum map to correlate outcomes to courses.
- c. Identify the score or rating required to demonstrate proficiency (e.g., Students must attain a score of “3” to be deemed proficient; at least 80% of students in the program will attain this benchmark.”
- d. Note what the aggregate level of proficiency actually was and the number of students included in the cohort or sample (e.g., “85% of the 25 students whose portfolios were reviewed met the established benchmark).
- e. This may be a specific individual, a position (e.g., assessment coordinator), or a group such as the department assessment committee. Minutes should reflect that results are shared with members of the department at least annually.

## **Part Two**

**In no more than one page, summarize 1) the discoveries assessment has enabled you to make about your students' learning, the curriculum, departmental processes, and/or the assessment plan itself; 2) the changes and improvements you have made or will make in response to these discoveries and/or the coordinator's feedback on the previous summary; and 3) what your assessment plan will focus on in the coming year.**

*If you would like to reference any supporting materials (departmental meeting minutes, detailed assessment results, etc.), please provide the URL at which they can be found.*

- 1) The assessment plan has been in place for one year in its current form. We are catching up on our assessment plan.
- 2) We have several meeting to adjust our assessment plan in the Objective 2 of our assessment.
- 3) We will implement our Objective 3 in the coming year.

**Student Learning Summary Report Rubric :: Office of Assessment & Accreditation :: Indiana State University**

Degree Program: BS in Mathematics Date: 8.24.16

	<b>Level 0 – Undeveloped</b>	<b>Level 1 – Developing</b>	<b>Level 2 – Mature</b>	<b>Level 3 – Exemplary</b>
<b>1. Student Learning Outcomes</b>	<input type="checkbox"/> No outcomes are identified.  <input type="checkbox"/> No Curriculum Map was provided.	<input checked="" type="checkbox"/> Outcomes were identified.  <input checked="" type="checkbox"/> Some of the outcomes are specific, measurable, student-centered, program-level outcomes.  <input checked="" type="checkbox"/> A Curriculum Map was provided.	<input type="checkbox"/> Outcomes are specific, measurable, student-centered, program-level outcomes.  <input type="checkbox"/> Outcomes at least indirectly support Foundational Studies Learning Outcomes or the Graduate Learning Goals.  <input type="checkbox"/> The Curriculum Map identifies where/to what extent each outcome is addressed.  <input type="checkbox"/> At least one outcome was assessed in this cycle.	<input type="checkbox"/> Outcomes are specific, measurable, student-centered program-level outcomes that span multiple learning domains.  <input type="checkbox"/> Outcomes directly integrate with Foundational Studies Learning Outcomes or the Graduate Learning Goals.  <input type="checkbox"/> Outcomes reflect the most important results of program completion (as established by an accreditor or other professional organization).  <input type="checkbox"/> Learning outcomes are consistent across different modes of delivery (face-to-face and online.)  <input type="checkbox"/> Outcomes are regularly reviewed (and revised, if necessary) by the faculty and other stakeholders.  <input type="checkbox"/> The Curriculum Map identifies where/to what extent each outcome is addressed and offers evidence that students have sufficient opportunity to master the associated learning outcomes.  <input checked="" type="checkbox"/> Two or more outcomes were

				assessed in this cycle.
<p><b>2. Measures &amp; Performance Goals</b></p>	<input type="checkbox"/> No measures are provided.  <input type="checkbox"/> No goals for student performance are identified.	<input type="checkbox"/> Measures are provided, but some are vague and/or do not clearly assess the associated outcomes.  <input type="checkbox"/> Measures are primarily indirect.  <input type="checkbox"/> Measures include course and/or assignment grades, but there is no evidence that grades are calibrated to the outcomes.  <input type="checkbox"/> Performance goals are identified, but they are unclear or inappropriate.	<input checked="" type="checkbox"/> At least one direct measure was provided for each outcome.  <input checked="" type="checkbox"/> Some information is provided to suggest that measures are appropriate to the outcomes being assessed.  <input type="checkbox"/> Measures include course and/or assignment grades, and general information is provided to indicate that grades are calibrated to the outcomes.  <input checked="" type="checkbox"/> Clear and appropriate standards for performance are identified. ?  <input type="checkbox"/> Mechanisms (rubrics, checklists, criterion-referenced exams, etc.) were provided.	<input type="checkbox"/> Multiple measures were provided, and a majority are direct.  <input type="checkbox"/> Detailed information is provided to show that measures are appropriate to the outcomes being assessed.  <input type="checkbox"/> Measures include course and/or assignment grades, and specific evidence is provided to demonstrate that grades are calibrated to the outcomes.  <input type="checkbox"/> Clear and appropriate standards for performance are identified and justified.  <input type="checkbox"/> If students are required to pass a certification or licensure exam to practice in the field, this was included as a measure.  <input type="checkbox"/> Measures assess some <a href="#">high impact practices</a> (internships, capstone course projects, undergraduate research, etc.)  <input type="checkbox"/> Some measures allow performance to be gauged over time, not just in a single course.  <input type="checkbox"/> Mechanisms (rubrics, checklists, criterion-referenced exams, etc.) were provided that demonstrate that the measure provides clear evidence of what students know/can do.

				<input type="checkbox"/> If a measure is used to assess more than one outcome, a clear explanation is offered to substantiate how this is effective.
<b>3. Results</b>	<input type="checkbox"/> No data are being collected.  <input type="checkbox"/> No information is provided about the data collection process.  <input type="checkbox"/> No results are provided.  <input type="checkbox"/> Students are meeting few of the performance standards set for them.	<input checked="" type="checkbox"/> Some data are being collected and analyzed.  <input checked="" type="checkbox"/> Some results are provided.  <input checked="" type="checkbox"/> Insufficient information is offered to demonstrate that data collection, analysis, and interpretation processes are valid.  <input checked="" type="checkbox"/> Students are achieving some of the performance standards expected of them.	<input type="checkbox"/> Data are being collected and analyzed.  <input type="checkbox"/> Results are provided.  <input type="checkbox"/> Some information is offered to demonstrate that data collection, analysis, and interpretation processes are valid and meaningful.  <input type="checkbox"/> Students generally are achieving the performance standards expected of them.	<input type="checkbox"/> Clear, specific, and complete details about data collection, analysis, and interpretation of results are provided to demonstrate the validity and usefulness of the assessment process.  <input type="checkbox"/> Students generally are achieving the performance standards expected of them and demonstrate continuous improvement on standards they have yet to achieve/achieve less well.  <input type="checkbox"/> If students are required to pass a certification or licensure exam to practice in the field, the pass rate meets the established benchmark.
<b>4. Engagement &amp; Improvement</b>	<input type="checkbox"/> No one is assigned responsibility for assessing individual measures.  <input type="checkbox"/> Assessment primarily is the responsibility of the program chair.  <input checked="" type="checkbox"/> No improvements (planned or actual) are identified.  <input checked="" type="checkbox"/> No reflection is offered about previous results or	<input type="checkbox"/> The same faculty member is responsible for collecting and analyzing most/all assessment results.  <input checked="" type="checkbox"/> It is not clear that results are shared with the faculty as a whole on a regular basis.  <input type="checkbox"/> Plans for improvement are provided, but they are not specific and/or do not clearly connect to the results.	<input checked="" type="checkbox"/> Multiple faculty members are engaged in collecting and analyzing results.  <input type="checkbox"/> Results regularly are shared with the faculty.  <input type="checkbox"/> The faculty regularly engages in meaningful discussions about the results of assessment.  <input type="checkbox"/> These discussions lead to the development of specific, relevant plans for improvement.	<input type="checkbox"/> All program faculty members are engaged in collecting and analyzing results.  <input type="checkbox"/> Faculty regularly and specifically reflect on students' recent achievement of performance standards and implement plans to adjust activities, performance goals, outcomes, etc. according to established timelines.  <input type="checkbox"/> Faculty and other important

	plans.	<input type="checkbox"/> Little reflection is offered about previous results or plans.	<input type="checkbox"/> Improvements in student learning have occurred as the result of assessment.	<p>stakeholders reflect on the history and impact of previous plans, actions, and results, and participate in the development of recommendations for improvement.</p> <p><input type="checkbox"/> Continuous improvement in student learning occurs as the result of assessment.</p> <p><input type="checkbox"/> Outcomes and results are easily accessible to stakeholders on/from the program website.</p> <p><input type="checkbox"/> Assessment is integrated with teaching and learning.</p>
<b>Overall Rating</b>	<input type="checkbox"/> <b>Level 0 – Undeveloped</b>	<input checked="" type="checkbox"/> <b>Level 1 - Developing</b>	<input type="checkbox"/> <b>Level 2 – Mature</b>	<input type="checkbox"/> <b>Level 3 – Exemplary</b>



## COMMENTS

### Strengths, Concerns, Recommendations for Improvement

#### 1. Learning Outcomes

The ten outcomes listed in the report are too narrow to be program-level outcomes. Their overarching objectives, however, may be suitable outcomes (if you believe they represent the most important categories of knowledge and skills graduates should possess). If you use the objectives as your outcomes, the items labeled “outcomes” can be moved to column b and used to describe the assessment methods. For example:

Outcome 1: Construct and use logical arguments.

Method of Assessment #1: Students construct direct proofs in Math 380.

In any case, I encourage you to review and revise the learning outcomes during the coming year. You also should revisit the program’s curriculum map, since it indicates that some outcomes are not addressed at all.

#### 2. Measures & Performance Goals

The program uses problems and tests (including the Major Field Test) to assess students’ mastery of the outcomes. In conjunction with column a, b provides sufficient evidence that the measures are appropriate to their related outcomes with one exception: Measuring students’ communication skills with homework problems and quizzes is unlikely to tell you what you need to know. Are the expectations for achievement (70% will meet or exceed standards) high enough for math majors? How do you determine whether or not students met expectations—do you use a rubric? I would appreciate knowing more about how you determine what students know and can do and at what level.

#### 3. Results

In most cases, generalizations about student performance are provided rather than numerical results, making it difficult for me to determine whether or not they met the program’s expectations. Please summarize results as you do for outcome 2.1.

#### 4. Engagement & Improvement

Several faculty members collect assessment results, but they do not appear to have been shared or discussed with the larger faculty recently. I understand that you are trying to get back up to speed with your assessment program, and I look forward to learning more next year about how well your students are achieving established outcomes and what changes you will make to ensure that they continuously improve.

Thanks!