

**Student Outcomes Assessment and Success Report AY2018-19**

*Completed reports due from the dean to the Assessment Office via Blackboard by October 15. Deans, assessment coordinators, and/or department chairs set their own internal deadlines for material review and request for refinement if not suitably addressing questions.*

Unit/Program Name: \_\_\_\_\_ MS in Mathematics \_\_\_\_\_ Contact Name(s) and Email(s) Cheng Zhao, \_\_\_\_\_ cheng.zhao@indstate.edu \_\_\_\_\_

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. Templates are available on the [assessment website](#).

**Part One**

<p>a. What learning outcomes did you assess this past 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 assignments or activities 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. What changes or improvements were made or will be made in response to these assessment results or feedback from previous year's report?</p>
<p><b>Objective 1:</b> Students will learn to use and construct mathematical proofs. <b>Outcome 1.1:</b> Students will construct direct proofs. G4, G5</p>	<p><b>Measure:</b> problems on Homework or Quiz or Exam Course: Math 510, Math 512, 513, 531, 603, 604, 640, 646, 650, etc..</p>	<p><b>Target:</b> 80% of the students completing and passing the course with C grade on the final test will be assessed by the committee as meeting or exceeding expectations</p>	<p>100% of students achieved higher than 80% on their assignments.</p>	<p>While students are performing well overall, more addition challenges or updated materials will be provided in teaching since the learning online resources are getting rich and easier.</p>
<p><b>Objective 1:</b> Students will learn to use and construct mathematical proofs. <b>Outcome 1.2:</b> Students will construct proofs by contradiction. G4, G5</p>	<p><b>Measure:</b> problems on Homework or Quiz or Exam Course: Math 510, Math 512, 513, 531, 603, 604, 640,646</p>	<p><b>Target:</b> 80% of the students completing and passing the course with C grade on the final test will be assessed by the committee as meeting or exceeding expectations</p>	<p>100% of students achieved higher than 80% on their assignments.</p>	<p>While students are performing well overall, more addition challenges or updated materials will be provided in teaching since the learning online resources are getting rich and easier.</p>

<p><b>Objective 1:</b> Students will learn to use and construct mathematical proofs.  <b>Outcome 1.3:</b> Students will construct proofs by induction. G4, G5</p>	<p><b>Measure:</b> problems on Homework or Quiz or Exam Course: Math 510, Math 512, 513, 531, 603, 604, 640, 646</p>	<p><b>Target:</b> 80% of the students completing and passing the course with C grade on the final test will be assessed by the committee as meeting or exceeding expectations.</p>	<p>100% of students achieved higher than 80% on their assignments.</p>	<p>While students are performing well overall, more addition challenges or updated materials will be provided in teaching since the learning online resources are getting rich and easier.</p>
<p><b>Objective 1:</b> Students will learn to use and construct mathematical proofs.  <b>Outcome 1.4:</b> Students will construct examples and counterexamples. G4, G5</p>	<p><b>Measure:</b> problems on Homework or Quiz or Exam Course: Math 510, Math 512,513,531, 603, 604, 640, 646</p>	<p><b>Target:</b> 80% of the students completing and passing the course with C grade on the final test will be assessed by the committee as meeting or exceeding expectations.</p>	<p>100% of students achieved higher than 80% on their assignments.</p>	<p>While students are performing well overall, more addition challenges or updated materials will be provided in teaching since the learning online resources are getting rich and easier.</p>
<p><b>Objective 2:</b> Students will communicate mathematics effectively.  <b>Outcome 2.1:</b> Students will state mathematical results accurately for a research problem. G4, G5  <b>Outcome 2.2:</b> Students will conduct an independent investigation of their own problems. G4, G5  <b>Outcome 2.3:</b> Students will make an oral presentation of their own research report that is accessible to their peers. G1  <b>Outcome 2.4:</b> Students will make a detailed written report of their research. G1, G2</p>	<p><b>Measure:</b> Student interview with course professor.  Courses: Math 695</p>	<p><b>Target:</b> 80% of the students completing and passing the course with C grade on the final test will be assessed by the committee as meeting or exceeding expectations.</p>	<p>The students in the math 695 class are working on their research paper. 4 students in each semester taking Math 695 and 4 graduated with MS degree.</p>	<p>Students presented research topics in class as well as in the form of online presentation organized by program director and peers: Fall 2018, Drs. Cheng Zhao and Peng Zhao Spring 2019, Drs. Cheng Zhao, Russell Lodge, and Peng Zhao. The synchronous and asynchronous online “smart classroom” presentation environment helps us a lot.</p>
<p><b>Objective 3:</b> Students will demonstrate that they are ready to use their mathematical skills in a post-master’s position.</p>	<p><b>Measure:</b> Students will be interviewed by the department chair or the chair’s representative.</p>	<p><b>Target:</b> 80% of the students completing the seminar will meet expectations (be happy with their placement) or</p>	<p>There are 4 graduate students graduated in Spring 2019.</p>	<p>The synchronous and asynchronous online “smart classroom” presentation environment helps us a lot.</p>

<b>Outcome 3.1:</b> Students will be polled after graduation to determine whether they planned to pursue further studies, had an offer of employment, etc. G1, G2		exceed expectation (be very happy with their placement)		
<b>Objective 3:</b> Students will demonstrate that they are ready to use their mathematical skills in a post-master's position. <b>Outcome 3.2:</b> Students will demonstrate mastery of mathematics and related content that will allow them to pursue careers utilizing their knowledge. G1, G2	<b>Measure:</b> grade point average in mathematics and related coursework	<b>Target:</b> 80% of the graduating students will meet expectations (at least 3.25 but less than 3.75) or exceed expectation (at least 3.75)	All of the graduating students are exceed expectation	By utilizing online resources and equipment, students demonstrate mastery of mathematics and related content that will allow them to pursue careers utilizing their knowledge.

Note: 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.

In the spring of 2019, we had two graduate faculty meetings regarding mathematics graduate program assessment. At the meetings, graduate faculty in the mathematics graduate program are informed of findings and involved in conversations about using them to make decisions regarding student learning. Also, graduate faculty regularly communicate by emails about the enrollments and retention rates of in the mathematics graduate program in the academic calendar year.

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 program's 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").

**Part 1b: Continuous Quality Improvement**

In no more than one page, summarize 1) the discoveries assessment has enabled you to make about student learning (a. What specifically do students know and do well—and less well? b. What evidence can you provide that learning is improving?); 2) what your assessment plan will focus on in the coming year; and 3) how will this information be shared with other stakeholders?

After all graduate faculty completed OICC certificate training (online teaching certificate), the Mathematics faculty finalized major changes to the master’s online graduate program in mathematics , it is clear that these changes have facilitated a significant growth in our enrollments by making the program more modern and more flexible for distance graduate students. In addition, the graduate courses have been offered synchronous/asynchronous online and on campus with the use of “smart classrooms.” This change has already increased and will continue to increase our enrollments in the program. Our assessment plan in the coming year will be: continue to increase our enrollments, keep graduate student retention rate high, and focus more on assessment of the graduate courses offered.

**Part 2a: Summary of Student Success Activities**

Based on the results of your assessment of student learning outcomes from Part 1 above, reflect on how this data will impact student success within your unit/program.

a. What goals/objectives were established this past year to aid student performance, retention, persistence, and completion?	b. What primary action steps were taken to make progress on each goal and who was responsible?	c. What data informs progress on each goal?	d. What were some accomplishments or achievements for each goal and/or challenges confronted?	e. Please indicate goals that are continuing and any goals that will replace a previous goal. Any additional goals can also be added on a new line.
<p><u>Objective 2:</u> Students will communicate mathematics effectively.</p> <p><u>Objective 3:</u> Students will demonstrate that they are ready to use their mathematical skills in a post-master’s position.</p>	<p>Students will state mathematical results accurately for a research problem.</p> <p>Students will conduct an independent investigation of their own problems.</p> <p>Students will make an oral presentation of their own research report that is accessible to their peers.</p> <p>Students will make a detailed written report of their research.</p> <p>Students will demonstrate mastery of mathematics and related content that will allow them to pursue careers utilizing their knowledge.</p>	<p>There are 51 graduate students who are taking our graduate courses in this semester. 20% of the graduate students are on-campus and 80% of them are distance graduate students. There are more graduate students continue to study in PhD programs.</p>	<p>Some accomplishments are: we have more graduate students in our graduate program in mathematics and there are more graduate students found more academic teaching and research positions/jobs. Since there are more distance graduate students enrolled in the graduate program in mathematics, the challenges confronted are the use of “smart classrooms.”</p>	<p>These goal that are continuing are: Students will communicate mathematics effectively and Students will demonstrate that they are ready to use their mathematical skills in a post-master’s position.</p>
2.				
3.				

## Notes

- a. These goals could be program/department wide but may also be focused on specific sub-populations of interest (e.g., service course student performance, transfer students, part-time students, students of a particular class year, students of color, etc.).
- c. Retention and completion data, D/F/drop rates, credit hour productivity (defined as credit hour enrollment at start of term versus credit hours earned at end of term) are common data examples. See [Blue Reports](#) database (access from Linda Ferguson in Institutional Research) or the [Office of Institutional Research](#) for ideas.

In the spring of 2019, we had two graduate faculty meetings regarding mathematics graduate program. At the meetings, graduate faculty in the mathematics graduate program are informed of findings and involved in conversations about using them to make decisions regarding student learning. Also, graduate faculty regularly communicate by emails about the enrollments and retention rates of in the mathematics graduate program in the academic calendar year.

### Part 2b: Continuous Quality Improvement

**In no more than one page, summarize 1) the discoveries that attention to student performance, retention, persistence, and completion has enabled you to make about program/department systems, processes, and norms as it effects students; and 2) how this will positively impact student success, including with regard to the readiness of students for graduate study or a career?**

After all graduate faculty have completed OICC certificate training (online teaching certificate), the Mathematics faculty has finalized major changes to the master's program in mathematics by making the program more modern and more flexible as an online graduate program. In addition, that the graduate courses are offered synchronous/asynchronous online and on campus with the use of "smart classrooms" enhance our program significantly. From last fall the Mathematics Graduate students have increased by 183%! A couple of thoughts on why this could be:

1. The number of distance students for the Mathematics MS degree has increased tremendously.
2. The major group of graduate students are High school Mathematics teachers (65%) who are looking to get the AP certification to teach dual credits. The other group of graduate students (35%) are interested in taking applied courses in statistics and other applied fields.

We will continue to offer more high quality synchronous/asynchronous online graduate courses and research projects.

**AY2018-19 Graduate Student Enrollment in Mathematics: Fall 2018: 18; Spring 2019: 30; Fall 2019: 51. From last fall the Mathematics Graduate students have increased by 183%!**

AY2018-19	Graduate Courses offered	Enrollment	Retention Rate
Fall 2018	Math510 Introduction to Analysis (Lodge)	1	100%
	Math512 Abstract Algebra (Jodi)	2	100%
	Math536 Numerical Analysis (Vin)	8	100%
	Math640 Graph Theory (Cheng)	19	100%
	Math650 Topic in Math (Peng)	10	100%
	Math695 Math Research (Cheng)	4	100%
Spring 2019	Math513 Linear Algebra (Peng)	15	100%
	Math531 Complex Variables (Lodge)	18	100%
	Math621 Modern Geometry (Liz)	10	100%

	<b>Math646 Linear Optimization (Cheng)</b>	<b>15</b>	<b>100%</b>
	<b>Math695 Math Research (Cheng)</b>	<b>4</b>	<b>100%</b>
<b>Summer 2019</b>	<b>Math603 Concepts of Fund Algebra (Liz)</b>	<b>22</b>	<b>100%</b>
	<b>Math 640 Graph Theory (Cheng)</b>	<b>19</b>	<b>100%</b>

**Master Degree Awarded: 4**

*Please prepare this report as a Word document. Do not include any attachments. Instead, provide links to important supporting materials (e.g., detailed—but not student-specific—assessment results; rubrics; minutes; etc.), or upload them to the college’s assessment site in Blackboard.*

Dear Cheng,

Thank you so much for sharing your assessment process and findings for AY 2018-19 with the Assessment Council. You will find feedback and ratings on the rubric below. It is understood that some of the feedback might encompass practices that you already engage in but were not documented in this report. As the purpose of this evaluation is focused on recognizing great work and helping faculty improve assessment practice, it is not necessary to retroactively add documentation. Please feel free to let me know if you have any questions or if there is any way I can assist you in further developing assessment in your program.

This report will be shared with the Associate Dean(s) and Dean of your college and summarized findings will be shared as composite college/institutional data with the President's Office and the Provost's team.

Sincerely,

Kelley (x7975)

<b>Program: M.S. Mathematics</b>	<b>Overall Rating: Developing (1.89/3.00)</b>
<b>Strengths</b>	<b>Recommendations</b>
<ul style="list-style-type: none"><li>• Learning outcomes and objectives are clear, specific, and measureable and are linked to the Graduate Student Learning Outcomes.</li><li>• Courses and measures used for assessment are clearly described, and multiple points of assessment from various classes are used, enhancing the ability to understand student achievement through a variety of performances.</li><li>• Expected and actual student performance is clearly described.</li><li>• Great information provided about how the improvement and expansion of online education has helped increase enrollment.</li><li>• Good information about how results are shared.</li></ul>	<ul style="list-style-type: none"><li>• Student performance on problems on homework, quizzes, and exams are typically direct measures of outcomes; however, the use of the overall course pass rate and grade on the final test make your data more indirect reflections of student learning. To improve the quality of your data to more directly reflect student learning of specific outcomes, use the student scores on the problems related only to the outcomes in question to understand achievement of that outcome. This takes a little more work to break out the data, but it will be worth it in the ways that it allows you to explore more granular data that can better reveal opportunities for improving and supporting student learning.</li><li>• Similarly, the use of grade point average to demonstrate achievement of a specific learning outcome is at best an indirect measure. Consider adding a second measure of outcome 3.2 to improve understanding of student achievement.</li></ul>

Evaluation Criteria	Exemplary	Mature	Developing	Undeveloped
<p><b>Student Learning Outcomes</b></p>	<p>At least one learning outcome that is aligned with program coursework is assessed this cycle.</p> <p>Learning outcome(s) is specific, measurable, and student-centered.</p> <p>Rationale for assessment of this outcome(s) is made clear (ex: it is part of a standing assessment cycle, a need was identified, etc.)</p> <p>Learning outcome(s) directly link to college, institutional, and/or accreditor goals/standards.</p>	<p>At least one learning outcome that is aligned with program coursework is assessed this cycle.</p> <p>Learning outcome(s) is specific, measurable, and student-centered.</p> <p>Rationale for assessment of this outcome(s) is made clear (ex: it is part of a standing assessment cycle, a need was identified, etc.)</p>	<p>At least one learning outcome that is aligned with program coursework is assessed this cycle.</p> <p>Learning outcomes(s) is measurable.</p>	<p>No learning outcomes are identified for assessment or the outcomes that are identified are not linked to program outcomes aligned with program coursework (e.g. – curriculum map) or are not measurable.</p>
<p><b>Performance Goals &amp; Measures</b></p>	<p>Performance goal identified for each learning outcome is clear and reasonable (ex: based on previous performance data, professional standards, etc.).</p> <p>Identified measures are designed to accurately reflect student learning, including at least one direct measure.</p> <p>Tools used to measure student performance are described and were reviewed for validity or trustworthiness prior to use (note this in the report; attach tools if applicable – ex: rubrics, checklists, exam keys, etc.).</p>	<p>Performance goal identified for each learning outcome is clear and reasonable (ex: based on previous performance data, professional standards, etc.).</p> <p>Identified measures are designed to accurately reflect student learning, including at least one direct measure.</p> <p>Tools or processes for evaluating student performance on measures are described (attach tools if applicable – ex: rubrics, checklists, exam keys, etc.).</p>	<p>Performance goal(s) is identified for each learning outcome.</p> <p>Identified measures (ex: assignments, projects, tests, etc.) are poorly suited to performance goals or are solely indirect measures.</p> <p>Tools or processes for evaluating student performance on measures are not described.</p>	<p>No goals for student performance of learning outcomes is identified, and/or no measures are provided.</p>



<b>Analysis &amp; Results</b>	<p>Data is collected using the measures and tools identified.</p> <p>Results are reported with clear description of quality analysis (e.g., analysis follows accepted statistical or qualitative procedures).</p> <p>Results are shared in relation to performance goals.</p> <p>Results are discussed in relation to college, institutional, and/or accretor goals/standards.</p>	<p>Data is collected using the measures and tools identified.</p> <p>Results are reported with clear description of analysis (e.g., analysis follows accepted statistical or qualitative procedures).</p> <p>Results are shared in relation to performance goals.</p>	<p>Data is collected using the measures and tools identified.</p> <p>Results are reported with little description of analysis.</p>	<p>No data is being collected.</p> <p>No results are provided.</p>
<b>Sharing &amp; Use of Results for Continuous Improvement</b>	<p>Clear information is provided about sharing and using results to inform practice.</p> <p>Discussion of what was learned from results is provided and connected to plans for sharing and using results to inform practice.</p> <p>A plan for adjusting performance, goals, assessment, and/or program components based on results is outlined.</p>	<p>Clear information is provided about sharing and using results to inform practice.</p> <p>Discussion of what was learned from results is provided and connected to plans for sharing and using results to inform practice.</p>	<p>Limited information is provided about sharing or using results to inform practice.</p> <p>Some discussion of what was learned from results is provided.</p>	<p>No information is provided about sharing or using results to inform practice.</p> <p>No evidence of reflection on results is provided (ex: discussion, conclusions drawn)</p>
<b>Overall Rating</b>	<input type="checkbox"/> Exemplary	<input type="checkbox"/> Mature	<input checked="" type="checkbox"/> Developing	<input type="checkbox"/> Undeveloped