

Student Outcomes Assessment and Success Report AY2019-20 Consult with your college dean's office regarding due date and how to submit. Deans will submit reports to the Office of Assessment & Accreditation annually by October 15.

Unit/Program Name: Mathematics

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Part 1a: Summary of Student Learning Outcomes Assessment

a. What learning outcomes did you assess this past year? If this is a graduate program, identify the Graduate Student Learning Outcome each outcome aligns with.	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?	c. What were your expectations for student performance?	d. What were the actual data/results?		e. What changes or improvements were made or will be made in response to these assessment results or feedback from previous year's report? Can expand on this in Part 2.
1. A.1.1 Proof – Direct	A problem covering direct proof was used. MATH 320	80% Recognition – knows direct proof is needed, but may contain lower level error 50% Execution – no error	Unaware-1 Recognized only-7 Executed-5	7.69% 53.85% 38.46%	Recognition is above but execution is below threshold. Focus will be on the executed group in upcoming cycles.
2. A.4.1 Proof – Induction	A problem covering induction was used. MATH 320	80% Recognition – knows an induction is needed, but may contain a lower level error 60% Execution – no error	Unaware- 1 Recognized only-5 Executed-7	7.69% 38.46% 53.85%	Recognition is above but execution is below threshold. Focus will be on the executed group in upcoming cycles.
3. B.1.1 Computation-Calculus	A problems covering chain rule was used. MATH 131	80% Recognition – knows the chain rule is needed, but may contain a lower error 70% Execution – no error	Unaware-12 Recognized only-5 Executed-76	12.90% 5.38% 81.72%	Recognition and execution are above threshold. Focus will be on maintaining this in upcoming cycles.
4. B.1.2 Computation-Calculus	A problem covering sequence convergence was used. MATH 132	80% Recognition – knows convergence of sequences, but may contain a lower level error 70% Execution – no error	Unaware-4 Recognized only-0 Executed-20	16.67% 0% 83.33%	Recognition and execution are above threshold. Focus will be on maintaining this in upcoming cycle.
5. B.3.1 Computation-Linear Algebra	A problem covering linear independence was used. MATH 313	70% Recognition – knows linear ind. is needed, but may contain a lower level error 50% Execution – no error	Unaware-2 Recognize only-5 Executed-7	14.29% 35.71% 50.00%	Recognition is above and execution is at threshold. Focus will be on maintaining this in upcoming cycles.
6. C.1.1 Application- Real World Problems	A problem covering position, velocity and acceleration was used. MATH 131	90% Recognition – knows position, vel and acc are needed, but may contain a lower level error 70% Execution – no error	Unaware-11 Recognized only-17 Executed-19	23.40% 36.17% 40.43%	Both recognition and execution are below threshold. Focus will be on reducing the gap next cycle.

7. C.2.2 Application – Problems in Math	A problem covering field extensions was used. MATH 412	70% Recognition – knows field extensions are needed, but may contain a lower level error 50% Execution – no error	Unaware-1 14.29% Recognized only-1 14.29% Executed-5 71.43%	Recognition and execution are both above threshold. Focus will be on maintaining this in upcoming cycles.
8. D.1.1 Oral Communication	Students presented on their senior project. MATH 494	90% Presented – students present, but with errors 70% Executed – no error	No Presentation-1 16.67% Presentation only-1 16.67% Executed-4 66.67%	Both submission and execution were below threshold. Focus will be on reducing the gap next cycle.

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.

Helpful Hints for Completing this Table

- Use your outcomes library as a reference. Note any alignment with professional standards, as applicable.
- Each outcome should 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 should 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. Describe or attach any evaluation tools such as rubrics, scales, etc.
- 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.)
- 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: Review of Student Success Data & Activities

Use [Blue Reports](#) to generate the following information (as well as any other information helpful to you):

- Cohort Sizes** 6 current majors
- Year-to-Year Retention** Fall 2017 – 59.30% Fall 2018 – 65.38% Fall 2019 – 58.33% Fall 2020 – 61.36%
- 5-Year Graduation Rate** Fall 2013 – 20.00% (No Fall 2014 value) Fall 2015 – 75%

What worked well in supporting student success this year?

Courses which are supported by the Math Lab are 131 and 132 (Calc I and II) seem to be successful. The result from 131 for the core concept of chain rule is promising. There were some technical issues with collecting data, and the results for C.1.2 may not be indicative of the true story. The result from 412, which is not supported by the Math Lab is promising due to the complex nature of the topic.

What are the most significant opportunities for improvement upon which to focus in the coming year?

Bridging that gap between the upper level courses and the expertise of the Math Lab is an opportunity for improvement. The proof component of the 320 course seems to be difficult material in general and since this is the first cycle, maybe the expectations have been set too high.

Part 1c: Summary of Career Readiness Activities

Please submit your Career Readiness Competencies curriculum map along with this report as a separate attachment. You can find the template here: <https://www.indstate.edu/assessment/plan-components>

Part 2: Continuous Quality Improvement

Reflect on the information shared above regarding student learning, success, and career readiness. In no more than one page, summarize:

- 1) the discoveries assessment and data review have enabled you to make about student learning, success, and career readiness (ex: What specifically do students know and do well—and less well? What evidence can you provide that learning is improving? How might learning, success, and career readiness overlap? What questions do your findings raise?)**

Our lower level service courses with the exception of Box 6e show that more students than expected were at the corresponding levels, which is a good sign that we are holding up our end as a service dept. An eye will be kept on the position, velocity and acceleration problem to see if that was an anomaly, or if the trend continues. It also remains to see if these courses will continue to be above threshold in the future. Being able to translate `fuzzy` information into a solvable form would aid a student's career readiness, as would success in a tough environment. Box 1e, 2e and 8e are minor concerns for now. For 494, the small number of students is at play (one more execution and all categories are above threshold). In particular, one student who is normally strong had difficulty completing the course due to mental health reasons. The material in 320 is normally tough for students, so it's possible the dept expectations are too high. A few more cycles should clarify this.

- 2) findings-based plans and actions intended to improve student learning and/or success (expansion of Part 1a, box e as needed)**

Box 1e and 2e contain problems for which students are recognizing the problems, but are not executing at the threshold level. Due to the difficult nature of the material, the Math Group will discuss both sides of the issue: are our expectations too high, or is there a way to facilitate students ability to perform the proofs. Direct proofs (box 1e) appear to need more attention than induction proofs (box 2e). Both instances also have a smaller number of students than one would like for a sample.

- 3) what your assessment plan will focus on in the coming year**

The next cycle has a different round of outcomes than the previous two, along with different courses, being assessed. There will be some standardization between recognition and execution thresholds by using this cycle to guide what the appropriate levels are for the next cycle, which is the last new cycle.

- 4) how this information will be shared with other stakeholders**

The courses fall under the umbrella of the Math Group. The results of the assessment will be shared via e-mail with the chairs of those committees, who will distribute the data to members as they see fit. At their next available meeting, the committees will discuss the results as well as interpret why they are happening, and then suggest any changes that could be made to facilitate improving the recognition, as well as the execution levels that are being reached.

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.

Thank you so much for sharing your assessment process and findings for AY 2020-21 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 practice and use 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)

Program: Mathematics B.S.	Overall Rating: Mature (2.75/3.00)
Strengths	Recommendations
<ul style="list-style-type: none"> • Student mastery of multiple LOs is informed by performance on direct measures. • Clear description of levels of mastery and expectations for mastery are included. Findings are shared in relation to these levels for clear interpretation of results. • Thoughtful discussion of areas for learning improvement is included, along with notes about expectations, student factors, and instructional methods. • It is clear that Math faculty are involved in the assessment process, discussing findings, and determining what actions to take based on results. Clear information is also provided about how assessment information is shared. 	<ul style="list-style-type: none"> • Include the full LO language in column a. This will more clearly show the alignment between the performance required by the LO, measures, and findings. • As you continue assessment, if there are certain LOs for which the data seems unclear consider adding another point of assessment from a different type of measure to see if that gives you additional insights that can help uncover the underlying issue. • In the discussion you talk about the service role the Math group fills. If the data reflects non-Math majors, you can break out the data by majors and non-majors to see the difference. The annual assessment report typically reflects program major students, but I think you make a point about the value of understanding overall performance in programs that contribute many service courses.

Evaluation Criteria	3 Exemplary	2 Mature	1 Developing	0 Undeveloped
<p>Student Learning Outcomes</p>	<p>Identified, aligned learning outcomes are specific, measurable, student-centered, and program-level. Outcomes directly integrate institution or college-level learning goals.</p> <p>Outcomes are consistent across modes of delivery (if applicable).</p> <p>More than one outcome is assessed this cycle, and rationale is provided for why they were selected for assessment.</p>	<p>Identified, aligned learning outcomes are specific, measurable, student-centered, and program-level. Outcomes support institution or college-level learning goals.</p> <p>Outcomes are consistent across modes of delivery (if applicable).</p> <p>At least one outcome is assessed this cycle.</p>	<p>Learning outcomes are identified and alignment with courses is demonstrated.</p> <p>Outcomes are consistent across modes of delivery (if applicable).</p> <p>At least one outcomes is assessed this cycle.</p>	<p>No learning outcomes are identified, and/or alignment of learning outcomes to courses is not demonstrated (e.g. – curriculum map).</p>
<p>Performance Goals & Measures</p>	<p>Performance goals are clear and appropriate, and rationale is provided for why these were selected.</p> <p>Identified measures and tools are assigned to each outcome, are clear and intentionally designed to address student performance on aligned outcomes, and rationale and examples are provided (e.g. – rubrics, checklists, exam keys). Most are direct measures, and their design enhances the validity of findings.</p> <p>Licensure exams and high-impact practices are reflected in measures (if applicable).</p>	<p>Performance goals are clear and appropriate.</p> <p>Identified measures and tools are assigned to each outcome, are clear and intentionally designed to address student performance on aligned outcomes, and examples are provided (e.g. – rubrics, checklists, exam keys). At least one direct measure is included.</p>	<p>Performance goals are identified with little rationale or clarity.</p> <p>Identified measures are poorly suited to performance goals, underdeveloped, or are solely indirect measures.</p>	<p>No goals for student performance of learning outcomes are identified, and/or no measures are provided.</p>

<p>Analysis & Results</p>	<p>Data collection process is clear and designed to produce valid/trustworthy results. The process is useful to those collecting and/or interpreting data.</p> <p>Data is collected and analyzed with clear rationale and description.</p> <p>Results are provided with thoughtful discussion of analysis and description of conclusions that can be drawn.</p>	<p>Data collection process is clear and designed to produce valid/trustworthy results.</p> <p>Data is collected and analyzed with clear rationale and description.</p> <p>Results are provided with some discussion of analysis.</p>	<p>Description of data collection is unclear as to process and quality.</p> <p>Some data is collected and analyzed with little rationale or description.</p> <p>Some results are provided with no discussion of analysis.</p>	<p>No information is provided about the data collection process, and/or no data is being collected.</p> <p>No results are provided.</p>
<p>Sharing & Use of Results for Continuous Improvement</p>	<p>A plan for sharing information and included program faculty and appropriate staff in discussion and planning is detailed and enacted. Outcomes and results are easily accessible on the program website or other appropriate designated area.</p> <p>Plans for improvement or change based on results are clear and connected to results. If few students met performance goals, this is included in discussion and plans.</p> <p>Reflection if offered about results or plans moving forward, and compares prior year plans to current outcomes in an effort to foster continuous improvement as a result of assessment process.</p>	<p>A plan for sharing information broadly across program faculty is detailed and enacted.</p> <p>Plans for improvement or change based on results are clear and connected to results. If few students met performance goals, this is included in discussion and plans.</p> <p>Reflection is offered about results or plans moving forward.</p>	<p>Information is provided about sharing results, but sharing is limited in scope or content.</p> <p>Plans for improvement or change based on results are incomplete, vague, or not clearly connected to results.</p> <p>Little reflection is offered about results or plans moving forward.</p>	<p>No information is provided about sharing results and/or plans for improvement or change based on results.</p> <p>No evidence of reflection on results in provided.</p>
<p>Overall Rating</p>	<p><input type="checkbox"/> Exemplary</p>	<p><input checked="" type="checkbox"/> Mature</p>	<p><input type="checkbox"/> Developing</p>	<p><input type="checkbox"/> Undeveloped</p>