Mathematical Sciences [MS] [MS-MSCI]

Cycles included in this report:
Jun 1, 2024 to May 31, 2025

Program Name: Mathematical Sciences [MS] [MS-MSCI]

Reporting Cycle: Jun 1, 2024 to May 31, 2025

1 Is this program offered via Distance Learning?

2 Is this program offered at an off-site location?

No

2.1 If yes to previous, provide addresses for each location where 50% or more of program credits may be earned.

3 Example of Program Improvement

2020-2021:
All program faculty learned to teach courses online. Students gained experience in online presentation of problems and the use of software for online collaboration that program faculty feel will be of use to our graduates in their future career paths.

2021-2022:
Faculty have begun preliminary discussion of new 600 level electives courses that could be offered to benefit our students. Topics that have suggested include nonparametric statistics and number theory.

2022-2023:
The department has begun to offer the MS Mathematical Sciences program as part of a 5 year dual degree program that will allow exceptional undergraduates in our BS program to accelerate their graduate coursework and complete the two degrees in a shorter amount of time. This change allows more students to consider the option of pursuing the MS degree which will prepare them for a wider range of career options without having to commit to a full two more years of college before beginning their careers or alternatively, having to attempt to work on the MS degree while working full time in their new career.

2023-2024:
One of our program faculty, Dr. Gohin Samad, started a mathematical seminar where faculty and invited speakers present mathematical topics from areas outside of the topics covered in our standard graduate coursework. This seminar allows students in our MS Mathematical Sciences to learn about other mathematical research that may be of interest to them in their independent research courses or provide direction for possible areas of further study for those interested in pursuing a PhD in mathematics.

2024-2025:
One of the core courses in the program MATH/CSCI 641 was restructured to provide students with the opportunity to study more varied mathematical topics in applied analysis.

4 Program Highlights from the Reporting Year

2020-2021:
Program graduate Haile Gilroy was accepted to Auburn University where she is pursuing further graduate coursework in Mathematics. The work that she completed with faculty mentor Neil Carnes during her time at McNeese has been submitted for publication.

2021-2022:
Faculty in the MS Mathematical Sciences program are pleased that the number of students enrolled in our Computer Science concentration has increased this year.

2022-2023:
Mathematical Sciences faculty started a new seminar during the spring 2023 semester. Two of our former graduates, Haile Gilroy and Steven Dabelow, from the MS Mathematical Sciences program were among the presenters this semester. Both of these students have moved on to pursue terminal degrees in the mathematical sciences.

2023-2024:
Dylan Coats, one our former majors, was featured in the *Lake Charles American Press* in January of 2024. The title of the story was "Dylan Coats experiences consistent joy in the classroom." Dylan is a high school teacher at Iowa High School.

2024-2025:
Two of our program alumni completed doctoral programs in mathematics. Brittain Qualls graduated with his Ph.D. from LSU and Haile Gilroy graduated with her Ph.D. from Auburn University.

5 Program Mission

The degree of Master of Science in Mathematical Sciences is designed to provide the student with knowledge of applied mathematics, pure mathematics, computer science, and statistics. It will also introduce the student to independent study and research. Upon completion of this degree, the student will be ready to work on a more advanced degree, to teach mathematics at the secondary or college level, or to use mathematical techniques in a scientific or industrial environment.

6 Institutional Mission Reference

This degree supports the University’s mission to offer graduate curricula in areas related to education and the sciences to the employers in southwest Louisiana, in particular local school districts, two-year colleges, and the local petrochemical industry.

7 Assessment and Benchmark MATH 541 Exam Questions

Assessment: MATH 541 Advanced Calculus I Exam Questions.

Benchmark 1: 70% of students will achieve 70% success on relevant final exam questions in MATH 541 Advanced Calculus I.

Benchmark 2: Students will achieve an average score of 3.5 out of 5 on each component of the assessment.

7.1 Data

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2020-2021	1/2	50%	No
2021-2022	2/2	100%	Yes
2022-2023	—	—	—
2023-2024	—	—	—
2024-2025	1/1	100%	Yes

7.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Math 541 is often taken by entering graduate students. Faculty have noticed that some entering graduate students are continuing to struggle with techniques of proof-writing. Faculty have noticed improvement as the students progress to higher level courses and plan to continue to emphasize proof-writing assignments for the graduate students in this course.

2021-2022:
Students were generally proficient at standard epsilon-delta proofs. These proofs are a basic part of beginning analysis.

2022-2023:
No graduate students from the MS Mathematical Sciences program were enrolled in Math 541 during the 2022-2023 academic year. Faculty anticipate that we will have graduate students enrolled in Math 541 to report on next year.

2023-2024:
No graduate students from the MS Mathematical Sciences program were enrolled in Math 541 during the 2022-2023 academic year. New graduate students in the Fall 2023 semester had already taken the first half of Advanced Calculus during their undergraduate coursework.

2024-2025:
Only one graduate student from the Mathematical Sciences program was enrolled in this course during Fall 2025. The student had a perfect score on her paper and was proficient at constructing valid mathematical arguments in analysis.

7.2 Data

Academic Year	# of Students	Average Student Scores		Benchmark met?
		Depth of Understanding	Clarity of Expression	
2020-2021	2	3.5	3.75	—
2021-2022	2	4.5	4.0	Yes
2022-2023	—	—	—	—
2023-2024	—	—	—	—
2024-2025	—	—	—	—

7.2.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Two students were assessed during the 2020-2021 academic year. One student did well on his problem presentations. The second student had a weaker mathematical background and found the assignments more challenging.

Faculty will set a benchmark for this new assessment item after collecting data for one more year.

2021-2022:
With some helpful hints, all the students were able to present their problem assignments to their classmates in a satisfactory manner.

Based on data collected so far, faculty have decided to set an initial benchmark for this assessment of 3.5 out of 5 for each component of the assessment.

2022-2023:
No graduate students from the MS Mathematical Sciences program were enrolled in Math 541 during the 2022-2023 academic year. Faculty anticipate that we will have graduate students enrolled in this course to report on next year.

2023-2024:
No graduate students from the MS Mathematical Sciences program were enrolled in Math 541 during the 2022-2023 academic year. New graduate students in the Fall 2023 semester had already taken the first half of Advanced Calculus during their undergraduate coursework.

2024-2025:
Due to changes in the faculty teaching the Advanced Calculus sequence and the absence of multiple faculty from the program for medical leave in the 2024-2025 academic year this analysis item was not included in the course. Adjustments have been made so that data collection will begin again the next time the course is taught.

8 Assessment and Benchmark MATH 542 Exam Questions

Assessment: MATH 542 Advanced Calculus II Exam Questions.

Benchmark 1: 70% of students will achieve 70% success on relevant final exam questions in MATH 542 Advanced Calculus II.

Benchmark 2: Students will achieve an average score of 3.5 out of 5 on each component of the assessment.

8.1 Data

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2020-2021	2/2	100%	Yes
2021-2022	2/2	100%	Yes
2022-2023	1/1	100%	Yes
2023-2024	1/1	100%	Yes
2024-2025	2/2	100%	Yes

8.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Students in Math 542 did very well on their final exams this year. Faculty are pleased with the results in the course this year and will continue to monitor these results.

2021-2022:
Students were all able to apply the Mean Value Theorem in an appropriate application.

2022-2023:
The student who was assessed this semester did well on the questions embedded on the final exam. As the methods used to teach Advanced Calculus II this semester resulted in such success, faculty plan to continue using these methods during the 2023-2024 academic year to collect additional data before making decisions about any necessary adjustments.

2023-2024:
The one graduate student in Advanced Calculus II who was assessed this spring did well on the embedded test questions. The Advanced Calculus sequence will be taught by new faculty starting next fall. Faculty have been engaged in discussions about teaching methods previously used in the course and faculty look forward to continuing some of the more successful techniques along with newer strategies. We anticipate continued student success on this assessment item.

2024-2025:
Two graduate students from the Mathematical Sciences program were enrolled in Math 542 for the Spring 2025 semester. The students were proficient at constructing valid mathematical arguments. One of the students struggled to rigorously communicate his arguments but still met the 70% benchmark.

8.2 Data

Academic Year	# of students	Average Student Scores		Benchmark met?
		Depth of Understanding	Clarity of Expression	
2020-2021	2	4.5	4.25	—
2021-2022	1	3.0	3.0	No
2022-2023	1	5.0	4.0	Yes
2023-2024	1	4.0	4.0	Yes
2024-2025	—	—	—	—

8.2.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Two students were assessed during the 2020-2021 academic year. Both students did very well on thier problem presentations throughout the semester.
Faculty will set a benchmark for this new assessment item after collecting data for one more year.

2021-2022:
One interesting presentation was made on "Why the Mean Value Theorem" from a recent journal article.

Based on data collected so far, faculty have decided to set an initial benchmark for this assessment of 3.5 out of 5 for each component of the assessment.

2022-2023:
The one student assessed this semester did well on their presentation. As minimal data was collected this year, faculty plan to continue with the same approach to including these presentations in Math 542 next year. Once additional data has been collected, faculty will discuss potential adjustments to aid student understanding in future academic years.

2023-2024:
The student presentation this year was fundamentally sound though there were some issues with vocabulary and notation during the presentation. Faculty plan to change the assignment to include a short meeting with the professor to summarize the plan for the presentation. This discussion should help to alleviate this type of issue with vocabulary and notation use.

2024-2025:
Due to changes in the faculty teaching the Advanced Calculus sequence and the absence of multiple faculty from the program for medical leave in the 2024-2025 academic year this analysis item was not included in the course. Adjustments have been made so that data collection will begin again the next time the course is taught.

9 Assessment and Benchmark MATH/CSCI 641 or CSCI 619 Exam Questions

Assessment: MATH/CSCI 641 Numerical Analysis or CSCI 619 Analysis of Algorithms Exam Questions.

Benchmark 1: 70% of students will achieve 70% success on relevant final exam questions in MATH /CSCI 641 Numerical Analysis.

Prior to 2022-2023, 70% of students will achieve 70% success on relevant final exam questions in MATH/CSCI 641 Numerical Analysis or CSCI 619 Analysis of Algorithms.

9.1 Data

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2020-2021	3	100%	Yes
2021-2022	4	100%	Yes
2022-2023	2	100%	Yes
2023-2024	—	—	—
2024-2025	4	100%	Yes

9.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Faculty were pleased to be able to complete the course under such difficult circumstances with two hurricanes impacting campus. The students persevered through distance learning courses with extended periods of no internet service. Under the circumstances faculty are pleased with the students results on their final exams.

2021-2022:
Students successfully applied the Contractive Mapping Theorem to show that a sequence given by recurrence is convergent and to find its limit.

CSCI 619 was removed from the core requirements for the Computer Science concentration. This course can still be used as an elective for the degree but is no longer required for all students in the concentration. As a result of this change, faculty will no longer collect data on this course. All concentrations will now be required to take MATH/CSCI 641. Data will continue to be reported for MATH/CSCI 641.

2022-2023:
The student in this course who has a concentration mathematics did well constructing mathematical arguments about topics including Taylor's Theorem as applied to error bounds. Faculty found that students with concentrations and/or backgrounds from other areas of the mathematical sciences struggled more during the semester but were still able to pass the assessment.

2023-2024:
Math 641 was not taught in the Fall 2023. Faculty anticipate that the course will run in the Fall 2024 semester.

2024-2025:
Three out of the four students in the course did extremely well. The fourth student was proficient at constructing valid mathematical arguments, however he had difficulty with some of the more involved algorithmic derivations.

10 Assessment and Benchmark Comprehensive Exam MATH 699

Assessment: Comprehensive Exam.

Benchmark 1: 90% of students will receive a passing grade of 70% or higher on comprehensive exams.

10.1 Data

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2020-2021	3/3	100%	Yes
2021-2022	3/3	100%	Yes
2022-2023	2/2	100%	Yes
2023-2024	3/3	100%	Yes
2024-2025	1/1	100%	Yes

10.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
In modern algebra students did well on all parts of the comprehensive exam. Faculty were especially pleased that students were able to complete portions of the comprehensive such as proof analysis that required more creative thought in addition to the more standard proof writing and computational portions of the exam.

In statistics, faculty were very pleased with students ability to compute a variety of statistical measures including the use the central limit theorem to calculate probabilities and quantiles of the standard mean. Faculty also commented on students in depth understanding of the theoretical background of statistical methods.

In analysis, it was reported that students did will with application of series with remainder term and polynomial interpolation. Students were proficient at deriving quadrature formulas. Faculty plan to include more multi-part proof and proof analysis exercises on future comprehensive exams.

2021-2022:
It was reported that some students continue to struggle with proof writing. However, all students tested at the level required to pass the comprehensive exams. One faculty member commented on the work of a student in constructing the lattice of subfields corresponding to the lattice of subgroups of a particular Galois group. The student presented the material in a somewhat new manner that gives a direct correspondence (by location in the lattice) between the subgroups and their corresponding fixed fields. Although it is not the standard way of doing things, faculty thought this showed some creativity and also demonstrated understanding of the relationship between the two lattices.

2022-2023:
Both students assessed during the 2022-2023 academic year did well on their comprehensive exams. Faculty are pleased with these results.

2023-2024:
In analysis, the student was able to successfully apply the Contractive Mapping Theorem to show that a sequence given by recurrence is convergent and to find its limit,but struggled to use infinite series to approximate function values. Algebra faculty reported that the student tested in this area was well prepared and performed very well on both computational and proof-oriented questions. However, it was reported by other faculty that one of the three students struggled with proof-oriented problems on his exam. Overall, faculty are pleased with the results, but plan to continue emphasizing the need to practice more theory-based proofs.

2024-2025:
Our one candidate did very well on her comprehensive exams. In her proof that compact subsets of metric spaces are closed she started with the right definition of compactness and closedness, but then took the wrong approach to prove the theorem. However, throughout the rest of her comprehensives she adequately illustrated her ability to construct valid mathematical arguments.

11 Assessment and Benchmark Alumni Survey

Assessment: Alumni Survey.

Benchmark 1: Overall average score of 4.50/5.00 on the following items:
Rate the training you received from McNeese in the following areas:
7(1): Critical thinking skills
7(2): Mathematical problem solving

Prior to 2018-2019, the benchmark was an overall average score of 4.00/5.00.

Benchmark 2: Overall average score of 4.50/5.00 on the following items:
Rate the training you received from McNeese in the following areas:
7(6): Ability to solve technical problems that arise in the workplace
7(7): Job specific skills, e.g., implementing programs for those in the computer science concentration.

Prior to 2018-2019, the benchmark was an overall average score of 4.00/5.00.
Prior to 2016-2017, the benchmark was 3.50/5.00 or higher.

11.1 Data

Academic Year	# of respondents	7(1)	7(2)	Benchmark Met?
2020-2021	—	—	—	—
2021-2022	3	5.00	5.00	Yes
2022-2023	4	5.00	5.00	Yes
2023-2024	3	5.00	5.00	Yes
2024-2025	3	4.83	4.66	Yes

11.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
No data available due to hurricanes.

2021-2022:
Data collection has resumed. We are looking at ways to improve data collection.

2022-2023:
Faculty believe that the end of the Covid-19 state of emergency and the ongoing recovery from Hurricanes Laura and Delta have helped increase response rates from our alumni. Faculty are pleased with the high scores on this years surveys.

2023-2024:
Faculty are pleased with the high scores on this year's surveys and plan to continue collecting survey data.

2024-2025:
Faculty are pleased to have met the assessment.

11.2 Data

Academic Year	# of respondents	7(6)	7(7)	Benchmark Met?
2020-2021	—	—	—	—
2021-2022	3	5.00	4.33	No
2022-2023	4	5.00	5.00	Yes
2023-2024	3	4.33	4.00	No
2024-2025	3	4.33	4.66	No

11.2.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
No data available due to hurricanes.

2021-2022:
Data collection has resumed. We are looking at ways to improve data collection.

2022-2023:
Faculty believe that the end of the Covid-19 state of emergency and the ongoing recovery from Hurricanes Laura and Delta have helped increase response rates from our alumni. Faculty are pleased with the high scores on this years surveys.

2023-2024:
Faculty believe that these are still good scores, though they are a little beneath the benchmark. We plan to continue to collect data before making any changes.

2024-2025:
The assessment item that remains just below the benchmark is graduates ability to express themselves through effective written communications. Faculty have discussed putting more emphasis on proof writing in the core courses. Changes have been made to the textbook being used in some core courses which should give more emphasis to proofs.

12 Assessment and Benchmark Exit Survey

Assessment: Exit Survey.

Benchmark 1: Overall average score of 4.50/5.00 on item:
16(1): Rate your confidence in your ability to use mathematics for problem solving.

Prior to 2018-2019, the benchmark was an overall average score of 3.50.

12.1 Data

Academic Year	# of respondents	Score	Benchmark Met?
2020-2021	1	5	Yes
2021-2022	1	5	Yes
2022-2023	2	5	Yes
2023-2024	3	4.3	No
2024-2025	—	—	—

12.1.1 Analysis of Data and Plan for Continuous Improvement

2020-2021:
Faculty are pleased to have met the assessment. However, due to the limited nature of the data available this year faculty will wait to collect more data before making a plan for improvement.

2021-2022:
Faculty are pleased to have met the assessment. Only 1 out of 3 students graduating with the degree completed and returned the survey. Faculty will reassess how and when the survey is provided to the students to try to encourage completion of this survey.

2022-2023:
All students who graduated with the degree returned the survey this semester. Faculty are pleased with this change and are also pleased to have met the benchmark.

2023-2024:
All students who graduated with the MS Mathematical Sciences this academic year returned the survey. Faculty acknowledge that we fell short of the benchmark; however, we are not upset about the individuals who reported a level four for their confidence in their ability to solve problems as these students are known to be hard working and humble.

2024-2025:
Only one student graduated with the MS Mathematical Sciences degree this year. She did not return the exit survey.