McNEESE STATE UNIVERSITY

Mathematical Sciences [MS] [MS-MSCI]

Cycles included in this report:
Jun 1, 2017 to May 31, 2018

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

Reporting Cycle: Jun 1, 2017 to May 31, 2018

1 Is this program offered via Distance Learning?

100% Traditional or less than 50% Distance/Traditional

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

2016-2017:
By applying the vocabulary and ideas from Bloom’s taxonomy, the syllabi for graduate mathematics courses have been rewritten. This was done as a response to the results from our course embedded assessment of the student learning outcome: 'Graduates construct valid mathematical arguments in the area of analysis'. The new syllabi should prove helpful to the faculty who teach the courses involved in constructing more appropriate embedded exam questions and also to more effectively evaluate the student responses to these questions. The result should be more useful data.

2017-2018:
To better meet the needs of students in our statistics concentration the department is creating a new course, biostatistics. This course will strengthen the breadth of relevant elective courses that our students can choose to take for their degree. The topic was chosen in part because of its relevance to several other applied areas of study including nursing, psychology, biology, and agricultural sciences.

4 Program Highlights from the Reporting Year

2016-2017:
Graduate students Samantha Courville, Sadie Newell, and Steven Dabelow each presented a talk at the annual meeting of the LA/MS section of the Mathematical Association of America held in Jackson, MS during the spring 2017 semester. In addition, Mr. Dabelow’s paper presentation placed second in the graduate student paper competition at this meeting.

Graduate faculty were very proud of graduate Steven Dabelow who is continuing his graduate studies at Notre Dame starting fall 2017.

2017-2018:
Graduate student Britt Qualls presented a talk "Some Bicyclic Antiautomorphisms of Mendelsohn Triple Systems" at the 49th Southeastern International Conference on Combinatorics, Graph Theory & Computing held at Florida Atlantic University on March 5, 2018.

Mr. Qualls work with Dr. Neil Carnes has also led to the following paper submission:
N. P. Carnes, B. L. Qualls, A Note on Bicyclic Antiautomorphisms of Mendelsohn Triple Systems, Congressus Numerantium, submitted.

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: Will be established once significant data is collected.

Course Links

MATH541 [Advanced Calculus I (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

7.1 Data [Approved]

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2013-2014	–	83.3%	Yes
2014-2015	–	81.8%	Yes
2015-2016	–	75.0%	Yes
2016-2017	–	100%	Yes
2017-2018	–	50.0%	No

Course Links

MATH541 [Advanced Calculus I (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

7.1.1 Analysis of Data and Plan for Continuous Improvement

2016-2017:
Faculty noted that questions requiring students to apply two or more important theorems simultaneously tend to have lower scores. This fact is not surprising to senior faculty, but faculty will continue to monitor.

2017-2018:
2/4 students achieved the necessary 70% or higher score. Benchmark was not met. The set of students being scored this year included two students switching to mathematics from an engineering background and two students entering the program with math education backgrounds while continuing to teach full-time. While all four students met the entrance requirements for the program, this may be the first proof-based mathematical course they had encountered. Faculty plan to make students in similar situations aware of the opportunity to take undergraduate courses that would strengthen their proof-writing skills before the move into their higher level math coursework.

Course Links

MATH541 [Advanced Calculus I (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

7.2 Data

2016-2017:
Data not yet available as this is a new assessment.

2017-2018:
Data not yet available as this is a new assessment.

Course Links

MATH541 [Advanced Calculus I (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

7.2.1 Analysis of Data and Plan for Continuous Improvement

2016-2017:
Faculty have agreed to create a new assessment for SLO1 – Problem Solving to be administered in MATH 541. Discussions about the structure of this new assessment will continue during the 2017-2018 academic year.

2017-2018:
Faculty will assign problems to each student in MATH 541 to be solved and presented to the class. Solutions will be rated by the professor and also by fellow students for correctness and clarity. These problems will be introduced to the course during the 2018-2019 academic year.

Course Links

MATH541 [Advanced Calculus I (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

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: Will be established once significant data is collected.

Course Links

MATH542 [Advanced Calculus II (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

8.1 Data [Approved]

	Students with	

Academic Year	70% or higher		Benchmark met?
	#	%	
2013-2014	–	100%	Yes
2014-2015	–	45.4%	Yes
2015-2016	–	87.5%	Yes
2016-2017	–	87.5%	Yes
2017-2018	–	60.0%	No

Course Links

MATH542 [Advanced Calculus II (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

8.1.1 Analysis of Data and Plan for Continuous Improvement

2016-2017:
Faculty are pleased with this result. Faculty will monitor Course Embedded Assessments in MATH 541 & 542 for one more year at which point we will consider revising the benchmark.

2017-2018:
3/5 students achieved the necessary 70% or higher score. Benchmark was not met. The set of students being scored this year included two students switching to mathematics from an engineering background and two students entering the program with math education backgrounds while continuing to teach full-time. While all four students met the entrance requirements for the program, this may be the first proof-based mathematical course they had encountered. Faculty plan to make students in similar situations aware of the opportunity to take undergraduate courses that would strengthen their proof-writing skills before they move into higher level math coursework.

Course Links

MATH542 [Advanced Calculus II (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

8.2 Data

2016-2017:
Data not yet available as this is a new assessment.

2017-2018:
Data not yet available as this is a new assessment.

Course Links

MATH542 [Advanced Calculus II (Lec. 3, Cr. 3)]

8.2.1 Analysis of Data and Plan for Continuous Improvement [Not Approved]

2016-2017:
Faculty have agreed to create a new assessment for SLO1 – Problem Solving to be administered in MATH 542. Discussions about the structure of this new assessment will continue during the 2017-2018 academic year.

2017-2018:
Faculty will assign problems to each student in MATH 542 to be solved and presented to the

class. Solutions will be rated by the professor and also by fellow students for correctness and clarity. These problems will be introduced to the course during the 2018-2019 academic year.

Course Links

MATH542 [Advanced Calculus II (Lec. 3, Cr. 3)]

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 or CSCI 619 Analysis of Algorithms.

Benchmark 2: Will be established once significant data is collected.

Course Links

CSCI619 [Analysis of Algorithms (Lec. 3, Cr. 3)]

CSCI641 [Topics in Numerical Analysis (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

9.1 Data [Approved]

Academic Year	% of students achieving 70%	Benchmark met?
2013-2014	70.37%	Yes
2014-2015	33.3%	No
2015-2016	59.5%	No
2016-2017	71.4%	Yes
2017-2018	83.3%	Yes

CSCI 619:

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2018-2019			

MATH/CSCI 641:

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2018-2019			

Course Links

CSCI619 [Analysis of Algorithms (Lec. 3, Cr. 3)]

CSCI641 [Topics in Numerical Analysis (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]

Graduates construct valid mathematical arguments in the area of analysis.

9.1.1 Analysis of Data and Plan for Continuous Improvement

2014-2015:
Basic computations with numerical analysis, taught in MATH/CSCI 533 Numerical Methods, are being de-emphasized in the MATH/CSCI 641 Numerical Analysis course. This will allow more emphasis to be placed on deeper analysis and the construction of mathematical arguments in analysis.

2015-2016:
Higher percentages of students are reaching the benchmark in MATH 641 & CSCI 619. Faculty will continue to monitor to see if this upward trend continues or improves as students who have already seen increased emphasis on proof-writing techniques in MATH 541 & MATH 542 move into MATH 641.

2016-2017:
Faculty are pleased to see a continuing upward trend in these results and are happy to have met the benchmark of 70%. Faculty will continue to monitor these results.

2017-2018:
5/6 students made the required score of 70%. Benchmark passed. Faculty believe that the new problem solving assessment being added to this course will also give students the benefit of more practice explaining problems to other students and additional feedback on the construction of their problem solutions. This should have a positive impact on student's ability to present mathematical arguments in a clear logical manner.

Course Links

CSCI619 [Analysis of Algorithms (Lec. 3, Cr. 3)]

CSCI641 [Topics in Numerical Analysis (Lec. 3, Cr. 3)]

Outcome Links

Mathematical Arguments [Program]
Graduates construct valid mathematical arguments in the area of analysis.

9.2 Data

2016-2017:
Data not yet available as this is a new assessment.

2017-2018:
Data not yet available as this is a new assessment.

Course Links

CSCI619 [Analysis of Algorithms (Lec. 3, Cr. 3)]

CSCI641 [Topics in Numerical Analysis (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

9.2.1 Analysis of Data and Plan for Continuous Improvement [Not Approved]

2016-2017:
Faculty have agreed to create a new assessment for SLO1 – Problem Solving to be administered in MATH 641. Discussions about the structure of this new assessment will continue during the 2017-2018 academic year.

2017-2018:
Faculty will assign problems to each student in MATH 542 to be solved and presented to the

class. Solutions will be rated by the professor and also by fellow students for correctness and clarity. These problems will be introduced to the course during the 2018-2019 academic year.

Course Links

CSCI619 [Analysis of Algorithms (Lec. 3, Cr. 3)]

CSCI641 [Topics in Numerical Analysis (Lec. 3, Cr. 3)]

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

10 Assessment and Benchmark Comprehensive Exam

Assessment: Comprehensive Exam.

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

Benchmark 2: 90% of students will receive a passing grade of 70% or higher on the comprehensive exam related to computer science coursework.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

10.1 Data [Approved]

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2013-2014	–	100%	Yes
2014-2015	–	100%	Yes
2015-2016	–	100%	Yes
2016-2017	–	100%	Yes
2017-2018	–	100%	Yes

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

10.1.1 Analysis of Data and Plan for Continuous Improvement

2016-2017:
Information about the strengths and weaknesses demonstrated on comprehensive exams was not collected this year. Faculty plan to collect data in the coming year to respond on IRE's request for additional information in the future.

2017-2018:
9/9 students completed their comprehensive exams with a score of 70% or higher. Benchmark met. Faculty have discussed strengths and weaknesses shown by students on these exams. For example, in MATH 651 students were stronger on the more computational problems and weaker with certain proof-type problems, including a noted difficulty with applications of the Cayley-Hamilton Theorem. In statistics courses, it was noted that overall students did well with choosing the correct statistical model to use for a given problem, but some students struggled with their interpretation of statistical output on certain problems. Also

in advanced calculus, it was noted that students seem to recognize problems involving the Contractive Mapping Theorem, but sometimes struggle in the correct application of this theorem.

Faculty plan to focus in on problems that involve these weaknesses when choosing assignments to be presented by students in class in order to give students additional feedback in these areas.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

10.2 Data [Approved]

Academic Year	Students with 70% or higher		Benchmark met?
	#	%	
2013-2014	–	100%	Yes
2014-2015	–	100%	Yes
2015-2016	–	100%	Yes
2016-2017	N/A	N/A	N/A
2017-2018	N/A	N/A	N/A

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

10.2.1 Analysis of Data and Plan for Continuous Improvement

2016-2017:
No students graduated with a concentration in Computer Science during the 2016-2017 academic year.

2017-2018:
No students graduated with a concentration in Computer Science during the 2017-2018 academic year.

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

11 Assessment and Benchmark Alumni Survey

Assessment: Alumni Survey.

Benchmark 1: Overall average score of 4.00/5.00 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

Benchmark 2: Overall average score of 4.00/5.00 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 2016-2017, the benchmark was 3.50/5.00 or higher.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

11.1 Data [Approved]

Academic Year	# of respondents	7(1)	7(2)	Benchmark Met?
2013-2014	–	5.00	5.00	Yes
2014-2015	–	5.00	5.00	Yes
2015-2016	–	4.67	4.67	Yes
2016-2017	–	4.50	4.33	Yes
2017-2018	–	4.80	5.00	Yes

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

11.1.1 Analysis of Data and Plan for Continuous Improvement

2015-2016:
This survey change occurred in 2013 and was in part necessitated by the move that shifted undergraduate computer science programs to the College of Engineering. The specific questions asked on the survey were also changed to better assess our graduates ability to effectively solve problems in the mathematical sciences. Because these scores are consistently high, next year the benchmark will be 4.00/5.00.

2016-2017:
Faculty raised the benchmark to 4.00/5.00 and are pleased to meet the new benchmark. Faculty will continue to monitor the results.

2017-2018:
Faculty are pleased to see alumni continue to rate these area high on survey results. Due to continued high scores, faculty choose to raise the benchmark for this assessment to 4.50/5.00 on each of these areas starting with the 2018-2019 academic year.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

11.2 Data [Approved]

Academic Year	# of respondents	7(6)	7(7)	Benchmark Met?
2014-2015	–	4.67	4.67	Yes
2015-2016	–	4.33	5.00	Yes
2016-2017	–	N/A	N/A	N/A
2017-2018	–	5.00	4.00	Yes

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

11.2.1 Analysis of Data and Plan for Continuous Improvement

2015-2016:
Faculty developed and implemented a new online alumni survey for graduates of our programs. Part of these changes were to remove questions that related to the undergraduate computer science program that moved from our department to the college of engineering. These questions were implemented in 2014-2015, and the benchmark will be raised to 4.00/5.00 next year.

2016-2017:
No students graduated with a concentration in Computer Science during the 2016-2017 academic year.

2017-2018:
Faculty are pleased to see alumni continue to rate these area high on survey results. Due to continued high scores, faculty choose to raise the benchmark for this assessment to 4.50/5.00 on each of these areas starting with the 2018-2019 academic year.

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

12 Assessment and Benchmark Exit Survey

Assessment: Exit Survey.

Benchmark 1: Overall average score of 3.50 on item:
16(1): Rate your confidence in your ability to use mathematics for problem solving.

Benchmark: 70% of students answering yes on items 11 and 12, and an average of 3.50 on item 16(2):
11. Do you feel able to solve technical problems that arise in a professional setting?
12. Do you feel able to design a computer based system, process, or program to meet specified needs?
16(2): Rate your confidence in your ability to design a problem solution in your discipline.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

12.1 Data

Academic Year	# of respondents	Score	Benchmark Met?
2015-2016	–	4.44	Yes
2016-2017	–	5.00	Yes
2017-2018	–	4.625	Yes

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

12.1.1 Analysis of Data and Plan for Continuous Improvement

2015-2016:
Exit survey was designed by faculty and benchmarks were set during the 2014-2015 academic year, and survey administration began in the fall 2015 semester. Faculty are pleased with the results of the new exit survey and will continue to monitor this student

feedback.

2016-2017:
Faculty are pleased with this result and will continue to monitor this survey data.

2017-2018:
Faculty are pleased to see degree candidates continue to rate their problem solving skills highly on exit surveys. Due to continued high scores, faculty choose to raise the benchmark for this assessment to 4.50/5.00 starting with the 2018-2019 academic year.

Outcome Links

Problem Solving [Program]
Graduates effectively solve problems in the mathematical sciences.

12.2 Data

Academic Year	# of respondents	Yes on #11		Yes on #12		Average on 16(2)	Benchmark Met?
		#	%	#	%		
2015-2016	–	–	100%	–	100%	4.33	Yes
2016-2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2017-2018	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

12.2.1 Analysis of Data and Plan for Continuous Improvement

2015-2016:
Faculty members are pleased with the new assessment, and after three years of data collection, we will review the benchmark.

2016-2017:
No students graduated with a concentration in Computer Science during the 2016-2017 academic year.

2017-2018:
No students graduated with a concentration in Computer Science during the 2016-2017 academic year.

Outcome Links

Computer Science [Program]
Candidates for the concentration in Computer Science will demonstrate the ability to design a computer-based system, process, or program to meet specific needs.

Program outcomes

Problem Solving
Graduates effectively solve problems in the mathematical sciences.

Mathematical Arguments
Graduates construct valid mathematical arguments in the area of analysis.

Computer Science
Candidates for the concentration in Computer Science will demonstrate the ability to design a

computer-based system, process, or program to meet specific needs.

End of report