# Mathematical Sciences [MS] [MS-MSCI]

**Cycles included in this report:**
Jun 1, 2020 to May 31, 2021

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

**Reporting Cycle: Jun 1, 2020 to May 31, 2021**

**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.

2018-2019:
Faculty in our graduate program discussed the need to ensure our students are exposed to mathematical literature as they complete their Masters in Mathematical Sciences. Graduates of our program should know how to search for articles about a mathematical topic and be able to find the most recent information available. They also should be comfortable reading articles in mathematical journals. An example of changes to ensure that our graduates will have these skills is the literature component that was added to MATH 641 during the 2018-19 academic year. Students in the course are now required to find an article in a mathematical journal that is relevant to the topics discussed in this class. After there article is approved, students prepare and present a presentation to the class on the approved topic.

2019-2020:

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.

**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.

2018-2019:
Two of our graduate students gave presentations at the spring sectional meeting held by the LA /MS Section of the MAA in Clinton, MS on February 22, 2019. Britt Qualls presented his talk "A Remark on Bicyclic Antiautomorphisms of Mendelsohn Triple Systems" and Jason Jones presented "Introduction to Sabermetrics". Both presentations won awards in the Student Paper Competition held at this conference.

2019-2020:

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.

## 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.

Outcome Links

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

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

### 7.1 Data

| Academic Year | Students with 70% or higher | | Benchmark met? |
|---|---|---|---|
| | # | % | |
| 2013-2014 | — | 83.3% | Yes |
| 2014-2015 | — | 81.8% | Yes |
| 2015-2016 | — | 75% | Yes |
| 2016-2017 | — | 100% | Yes |

| | | | |
|---|---|---|---|
| 2017-2018 | — | 50% | No |
| 2018-2019 | 3/5 | 60% | No |
| 2019-2020 | — | — | — |
| 2020-2021 | 1/2 | 50% | No |

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.

2018-2019:
The concept of sequential continuity was one area in particular that was difficult for our students this semester. Faculty have observed a continuing trend of students finding it difficult to integrate more than one concept into a single proof. In future semesters, students will be assigned a greater number of problems requiring integration of more than one concept into a single proof.

2019-2020:

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.

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.

| Academic Year | # of Students | Average Student Scores | | Benchmark met? |
|---|---|---|---|---|
| | | Depth of Understanding | Clarity of Expression | |
| 2018-2019 | 5 | 3.20 | 3.80 | — |
| 2019-2020 | — | — | — | — |

| | | | | |
|---|---|---|---|---|
| 2020-2021 | 2 | 3.5 | 3.75 | — |

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.

2018-2019:
Faculty introduced this new assessment into the MATH 541 course during the fall 2018 semester. Graduate students presented an assigned problem to the class and were graded in two categories: Depth of Understanding and Clarity of Expression. Each category was graded using a rubric with the following scores: 1=poor, 2=below average, 3=average, 4=above average, 5=excellent.

Faculty will collect data for three years before setting a benchmark to be met in this assessment.

Five students were assessed during the 2018-2019 academic year. One student really struggled with this assignment. This seems to be because of a poor mathematical background, but faculty will continue to monitor to see if a statistically significant trend develops. An interesting example of a problem presentation was a proof that the sequence {sin n} does not converge.

2019-2020:

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.

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.

Outcome Links

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

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

## 8.1 Data

| Academic Year | Students with 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% | No |
| 2018-2019 | 7/7 | 100% | Yes |
| 2019-2020 | — | — | — |
| 2020-2021 | 2/2 | 100% | Yes |

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.

2018-2019:
All of the students did well this year. This is partly explained by the fact that the final exam questions sampled were questions from exams given through the semester in this course and the students fully expected to get demonstrate mastery of this same material on the final exam if they had scored poorly on that question previously. The students were well prepared. Had the questions not been expected the results might have been different.

The questions involved an application of the Mean Value Theorem to prove an inequality, a comparison theorem for the convergence of an improper integral and a convergence result for power series.

2019-2020:

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.

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.

| Academic Year | # of students | Average Student Scores | | Benchmark met? |
|---|---|---|---|---|
| | | Depth of Understanding | Clarity of Expression | |
| 2018-2019 | 7 | 3.57 | 4.00 | — |
| 2019-2020 | — | — | — | — |
| 2020-2021 | 2 | 4.5 | 4.25 | — |

#### 8.2.1 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 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.

2018-2019:
Faculty introduced a new assessment item into the MATH 542 course during the Spring 2019 semester. Students will be assessed on their ability to solve problems in the Mathematical Sciences. Assessment comes from a problem assigned to each student and presented to the class. These problems are graded on a rubric with a 5-point scale. Scores are assigned for two categories: Depth of Understanding and Clarity of Expression. The student's strongest area this year was Clarity of Expression. Faculty will collect data from this assessment for three years before setting a benchmark.

2019-2020:

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.

## 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.

Outcome Links

**Mathematical Arguments [Program]**

Graduates construct valid mathematical arguments in the area of analysis.

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

### 9.1 Data

| 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 | 0 | — | — |
| 2019-2020 | — | — | — |
| 2020-2021 | 0 | — | —— |

MATH/CSCI 641:

| Academic Year | Students with 70% or higher | | Benchmark met? |
|---|---|---|---|
| | # | % | |
| 2018-2019 | 7 | 100% | Yes |
| 2019-2020 | — | — | — |
| 2020-2021 | 3 | 100% | Yes |

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.

2018-2019:
Benchmark is met. The students were successful in applying the Contractive Mapping Theorem, a fundamental theorem in Numerical Analysis.

2019-2020:

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.

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.

| Academic Year | # of students | Average Student Scores | | | | Benchmark met? |
|---|---|---|---|---|---|---|
| | | Depth of Understanding | Clarity of Expression | Level of Difficulty | Ability to Solve Related Problems | |
| 2018-2019 | 6 | 3.83 | 3.83 | 4.17 | 4.17 | — |
| 2019-2020 | — | — | — | — | — | — |
| 2020-2021 | — | — | — | — | — | — |

Outcome Links

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

#### 9.2.1 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 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 641 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. The typo (course number) above is now corrected, but faculty would like to point out relative to the comment from our 2017-2018 analysis that there is no data from 2018-2019 to analyze. Faculty were creating new assessment items that are similar in concept for multiple courses and as the descriptions are similar, we felt that copy/paste was appropriate in this case. Of course, moving forward with actual data, we will evaluate and analyze these different assessment items individually.

2018-2019:
Faculty introduced a new assessment into the MATH 641 course this year. Each student will be assessed on a presentation to the class. They will be graded in the following four categories: Depth of Understanding, Clarity of Expression, Level of Difficulty, Ability to Solve Problems associated with Topic of Presentation. Grading is to be completed using a rubric based on scores from one to five. We are pleased that the student's strongest areas this year were Level of Difficulty and Ability to Solve Related Problems. Faculty will collect data for three years before setting a benchmark for this new assessment.

2019-2020:

2020-2021:
Data is not available for this semester due to the abridged semester caused by Hurricanes Laura and Delta.

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

**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.

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

### 10.1 Data

| 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 |
| 2018-2019 | 4/4 | 100% | Yes |
| 2019-2020 | — | — | — |
| 2020-2021 | 3/3 | 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.

2018-2019:
In advanced calculus the students did well at applying the appropriate convergence tests to infinite series. Students showed a good knowledge of important theorems in real analysis, including the Intermediate Value Theorem, the Mean Value theorem and the Fundamental Theorem of Calculus. Program faculty report that students achieved good results in the areas of Modern Algebra and Graph Theory. Applying these same theorems is our main challenge. Faculty will discuss strategies for placing greater emphasis on applications of theorems in future semesters.

2019-2020:

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.

Outcome Links

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

## 10.2 Data

| Academic Year | Students with 70% or higher | | Benchmark met? |
|---|---|---|---|
| | # | % | |
| 2013-2014 | — | 100% | Yes |
| 2014-2015 | — | 100% | Yes |
| | | | |

| | | | |
|---|---|---|---|
| 2015-2016 | — | 100% | Yes |
| 2016-2017 | — | — | — |
| 2017-2018 | — | — | — |
| 2018-2019 | — | — | — |
| 2019-2020 | — | — | — |
| 2020-2021 | 1 | 100% | 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.

### 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.

2018-2019:
No students graduated with a concentration in Computer Science during the 2018-2019 academic year.
Faculty expect that we will have two to three computer science concentration graduates during the 2019-2020 academic year.

2019-2020:

2020-2021:
Faculty were pleased to have a student complete the Computer Science concentration of the Mathematical Sciences degree. Faculty reported that this student did very well on his comprehensive exams. Detailed results from the computer science comprehensive exam are not available at this time due to faculty being displaced from their offices as a result of hurricane damage.

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 4.50/5.00 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.

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.

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

## 11.1 Data

| 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 |
| 2018-2019 | 5 | 4.20 | 4.40 | No |
| 2019-2020 | — | — | — | — |
| 2020-2021 | — | — | — | — |

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.

2018-2019:
While the new data meets the previous year's benchmark, we have failed to meet the new higher benchmark of 4.5/5. One student gave particularly low ratings. Respondents will be encouraged to provide comments for low ratings in the future.

2019-2020:

2020-2021:
No data available due to hurricanes.

Outcome Links

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

### 11.2 Data

| 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 | — | — | — | — |
| 2017-2018 | — | 5.00 | 4.00 | Yes |
| 2018-2019 | 5 | 4.00 | 4.20 | No |
| 2019-2020 | — | — | — | — |
| 2020-2021 | — | — | — | — |

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.

2018-2019:
Benchmark was not met. Program faculty are reevaluating the decision to lift the benchmark to 4.5. Data will be tracked for another year before an additional change is made. Efforts will be made to solicit a greater number of responses in order to improve reliability of this assessment.

2019-2020:

2020-2021:
No data available due to hurricanes.

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 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.

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

**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.

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

## 12.1 Data

| Academic Year | # of respondents | Score | Benchmark Met? |
|---|---|---|---|
| 2015-2016 | — | 4.44 | Yes |
| 2016-2017 | — | 5.00 | Yes |
| 2017-2018 | — | 4.63 | Yes |
| 2018-2019 | 2 | 5 | Yes |
| 2019-2020 | — | — | — |
| 2020-2021 | 1 | 5 | 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.

2018-2019:
Benchmark is met. Efforts will be made to ensure that ALL graduates complete the exit survey.

2019-2020:

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.

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 | — | — | — | — | — | — | — |
| 2017-2018 | — | — | — | — | — | — | — |
| 2018-2019 | — | — | — | — | — | — | — |
| 2019-2020 | — | — | — | — | — | — | — |
| 2020-2021 | 1 | 1 | 100% | 1 | 100% | 5 | 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.

### 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 2017-2018 academic year.

2018-2019:
No student graduated with a concentration in Computer Science during the 2018-2019 academic year.

2019-2020:

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.

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.

End of report