LSUA Annual Assessment Form

Bachelor of Science in Mathematics	2015 - 2016
Reporting Unit	Academic Year

Section I

LSUA Goal:

II f. The University will complete all objectives and implement all strategies delineated in its SACS Quality Enhancement Plan (2004).

Statement of Purpose

The department offers mathematics majors the opportunity to master calculus, linear algebra, and differential equations, and to learn how to construct basic mathematical proofs. In addition, majors are taught to use technology effectively in mathematics. Graduates will be able to secure appropriate employment or continue on to graduate or professional school.

Unit Desired Outcome:

1. The graduate will have mastered the basic mathematics content of calculus, linear algebra, and differential equations.

Assessment Methods and Criteria

1. Basic calculus, linear algebra, and differential equations problems will be imbedded on exams in MATH 2057 Multivariable Calculus, MATH 3065 Differential Equations, and MATH 3085 Linear Algebra. Students will score at least 70% on average on these questions.

2. Each graduate will take Educational Testing Services' Major Field Test in Mathematics. More than half will score in the 25th percentile or higher.

Section II

Results of Assessment

1. The six students in MATH 2057 completed imbedded multivariable calculus problems on the final exam. The students were asked to use the appropriate chain rule to take derivatives of a multivariable function and set up and evaluate a double integral to compute the volume of a tetrahedron. The scores ranged from 29% to 100% with an average of 85.7% on the chain rule problem. They ranged from 14% to 100% with an average of 73.8% on the volume problem. Five students completed the imbedded differential equations problems. The items included (1) solving a differential equation with a solution of the form $y = x^n$, and (2) solving an inhomogeneous second degree equation with constant coefficients. The scores ranged from 50% to 100% with an average of 81.7%. Eight students completed the

imbedded linear algebra problems. The items dealt with the Gram-Schmidt algorithm, dimension and basis of kernel and range, and eigenvalues and eigenvectors. On the three problems, the students scored 92.7%, 81.3%, and 92.7%, respectively, on average.

2. The department required this exam for the first time in the fall of 2010. From the 2010-2011 academic year through the 2014-2015 academic year, some 19 graduates took the exam. Their scores ranged from the first to the 62nd percentile. Ten of the 19 – or 53% - received scores in the 25th percentile or higher. In the current academic year there were ten graduates. One student scored in the 95th percentile and another in the 81st, attaining the two highest scores in the history of the program. The other eight scores were in the 69th, 56th, 32nd,17th, 17th, 11th, 11th, and 11th, percentiles.

Section III

Use of Results

1. With a retirement in the mathematics faculty, the department has hired an assistant professor who is completing the PhD summer 2016 and who has expertise in algebraic structures. This faculty member will join the ranks of those who teach calculus, linear algebra, differential equations, and foundations of mathematics. The department will continue employing several successful upper level mathematics majors to offer tutoring. Faculty will continue to analyze student performance on embedded final exam problems.

2. Based on higher scores in the last two academic years, the program will raise the goal to more than half scoring at the 30th percentile or higher. The BS in Mathematics curriculum has been modified to attract more students and better prepare students for workforce needs. For the 2015-2016 academic year, concentrations in mathematics, actuarial science, computer science, and secondary education, were added. The foundation of required classes for the major, regardless of concentration, includes the calculus sequence, linear algebra, differential equations, and an introduction to proofs.

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Unit Desired Outcome:

2. The graduate will be able to construct basic mathematical proofs and use technology effectively in mathematics.

Assessment Methods and Criteria

1. Problems requiring the student to prove basic mathematical results will be imbedded on the MATH 3040 Fundamentals of Mathematics final exam. Students will score at least 70% on average on these questions.

2. Appropriate technology assignments will be given in courses mathematics majors take. At least three quarters of graduates will score 80% or higher on the assignments.

Section II

Results of Assessment

1. The nine students in MATH 3040 Foundations of Mathematics completed three imbedded problems to prove a conjecture directly, to prove another conjecture indirectly, and to establish a result on the natural numbers via mathematical induction. The students scored on average 75.0%, 78.7%, and 83.3%, respectively, on the three problems.

2. All 2015-2016 graduates took MATH 4700 History of Mathematics. An assignment was given to use Computer Algebra Software to

determine the accuracy of Euler's historic Basel series approximation of pi. Some 64% of the students scored 80% or higher on the assignment.

Section III

Use of Results

1. The faculty will continue assessing graduates' ability to prove mathematical results via imbedded problems in MATH 3040.

2. The assessment shows a need to improve students' mastery of technology. A commercial computer algebra system is available to students in the mathematics tutoring lab. A more comprehensive approach will be taken to show students how to use this software and assess their knowledge of it. The department added CSCI 2350/2351 Computer Programming I and II to the catalog fall 2015. It also created MATH 3259 Discrete Structures, a course covering mathematical topics applicable to computer science. Some seven students took Computer Programming I fall 2015, and 11 have enrolled in the fall 2016 section as of June 2016. Faculty will discuss whether to require a programming course in the BS in Mathematics curriculum.

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Unit Desired Outcome:

3. The graduate will be prepared to secure appropriate employment or continue on to graduate school.

Assessment Methods and Criteria

1. At least 75% of the graduates will have found employment or will have been accepted to graduate school within six months of receipt of their degree.

2. The faculty will maintain up-to-date electronic degree audit sheets on a shared drive.

Section II

Results of Assessment

1. Ten students graduated in the 2015-2016 academic year. Three finished in December, six in May, and one in June. Four have entered academic programs – PhD in Computational Analysis and Modeling, MS in Math, MS in Physics, and BS in Mechanical Engineering, one is teaching high school and pursuing alternative certification, one is working for a petroleum company, one is working in an accounting office, one is working as a security operative at a local casino, and one is working in retail as she pursue alternative certification.

2. Updated audit sheets were maintained.

Section III

Use of Results

1. The department will continue monitoring the employment activity and educational pursuits of its completers.

2. Based on an analysis of the audit sheets, the chair will ensure the department offers upper level classes students need to graduate. Faculty will continue contacting majors periodically to discuss what classes they should take each term.