

**Assurance of Student Learning
2019-2020**

Ogden College of Science & Engineering

Department of Mathematics

085 Master of Science in Mathematics

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Use this page to list learning outcomes, measurements, and summarize results for your program. Detailed information must be completed in the subsequent pages.

Student Learning Outcome 1: Students should possess knowledge of a broad topic in mathematics commensurate with that of a Masters graduate.

Instrument 1	All students must take a minimum of 30 credit hours of graduate-level mathematics courses. The courses of the MS program give a broad and deep background in the given concentration.
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 1.	Met	Not Met
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Student Learning Outcome 2: Students should be able to apply research methods to understand mathematical problems and possess the ability to apply technology and other tools to effectively investigate mathematical problems.

Instrument 1	Masters thesis.
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Instrument 2	Comprehensive exam.
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.	Met	Not Met
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Student Learning Outcome 3: Students should be able to speak and write with mathematical maturity commensurate with that of a Masters graduate.

Instrument 1	Masters thesis.
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Instrument 2	Comprehensive exam.
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Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.	Met	Not Met
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Program Summary (Briefly summarize the action and follow up items from your detailed responses on subsequent pages.)

For students starting the graduate program in the Fall 2020, all students will be required to complete a 33-credit-hour Masters program. First, the students have three core courses – one each from statistics, applied mathematics, and discrete mathematics. Second, all students must take MATH 598, which is a seminar course emphasizing communication in the discipline. Third, all students will be required to complete a Master’s thesis. We believe these changes to the program will enhance the opportunity for all students in the program to have a set of broad topics in mathematics while simultaneously improving their ability to apply research methods and communicate mathematics in a mature way.

Student Learning Outcome 1

Student Learning Outcome	Students should possess knowledge of a broad topic in mathematics commensurate with that of a Masters graduate.		
Measurement Instrument 1	All students must take a minimum of 30 credit hours of graduate-level mathematics courses. The courses of the MS program give a broad and deep background in the given concentration.		
Criteria for Student Success	Completion of the broad-based curriculum in their concentration while maintaining a 3.0 GPA on a 4-point scale.		
Program Success Target for this Measurement	90%	Percent of Program Achieving Target	89%
Methods	<p>The 085 program, which requires a minimum of 30 credit hours for completion, has three concentrations: general math, computational math, and mathematical economics. The concentration in general math requires the student take</p> <ul style="list-style-type: none"> • Intermediate Analysis I; • Complex Variables; • either Algebraic Systems, Partial Differential Equations, or Topology I; • either Real Analysis, Advanced Applied Mathematics I, Graph Theory, or Complex Analysis; • a research tool course; and • 6 other courses from a wide range of graduate mathematics and statistics topics. <p>The concentration in computational mathematics requires the student take</p> <ul style="list-style-type: none"> • Numerical Analysis I and II; • Introduction to Operations Research; • the computer science course Analysis of Algorithms; • the statistics course Statistical Methods I; • two computer science courses from Parallel and Distributed Computing, Data Mining Techniques and Tools, and Advanced Topics in Computer Science; • a research tool course; and • three courses from our more applied graduate mathematics and statistics topics. <p>The concentration in mathematical economics requires the student take</p> <ul style="list-style-type: none"> • three economics courses Regression and Econometric Analysis, Applied Microeconomic Theory, and Applied Macroeconomic Theory; • the statistics course Statistical Methods I; • either Intermediate Analysis I or Probability and Statistics II; • either Advanced Differential Equations or Statistical Methods II; • a research tool course; and • four courses from our more applied graduate mathematics, statistics, or economics topics. <p>All of these courses are graduate courses and are three credit hours. We had nine students in the program. Four</p>		

	<p>graduated upon completion of their thesis and coursework, while another four are continuing and are on schedule to graduate in the next two years. One student decided to move from the MS program to the MA program since the student felt that the MA program better met his or her needs.</p>	
<p>Based on your results, highlight whether the program met the goal Student Learning Outcome 1.</p>	<p>Met</p>	<p>Not Met</p>
<p>Actions (Describe the decision-making process and actions for program improvement. The actions should include a timeline.)</p>		
<p>Beginning this year, all incoming students will be required to take a core set of courses in statistics, discrete mathematics, and applied mathematics. In addition, the students will be required to take MATH 598, a seminar course that emphasizes communication in the discipline, and complete a Master's thesis.</p>		
<p>Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)</p>		
<p>We will continue to monitor how these changes affect our rates of meeting our criteria.</p>		
<p>Next Assessment Cycle Plan (Please describe your assessment plan timetable for this outcome)</p>		
<p>We believe the best assessment cycle would be every two years since the first set of students under our curricular changes will likely have graduated by then.</p>		

Student Learning Outcome 2

Student Learning Outcome	Students should be able to apply research methods to understand mathematical problems and possess the ability to apply technology and other tools to effectively investigate mathematical problems.		
Measurement Instrument 1	Masters thesis.		
Criteria for Student Success	Committee approval of the completion and defense of the masters thesis.		
Program Success Target for this Measurement	90%	Percent of Program Achieving Target	89%
Methods	All students choosing the thesis option must complete a rigorous masters thesis with the supervision of a member of our graduate faculty, and defend that thesis upon its completion to that faculty member and two other faculty that they choose to be on their committee. The committee must agree that the students has completed a rigorous thesis and defended it successfully. 4 students successfully defended their Master’s thesis. 4 more are scheduled to complete a Master’s thesis in the next two years. One student changed from the MS to the MA program after their first semester in the MS program.		
Measurement Instrument 2	Comprehensive exam.		
Criteria for Student Success	Successful completion of the comprehensive exam, to the satisfaction of the three faculty constructing the exam.		
Program Success Target for this Measurement	90%	Percent of Program Achieving Target	NA
Methods	No students took the comprehensive exam.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 2.			Met
Not Met			
Actions (Describe the decision-making process and actions planned for program improvement. The actions should include a timeline.)			
We are removing the comprehensive exam option from our program, and requiring each program student to complete and defend a masters thesis. The changes have been implemented for the 2020-2021 academic year.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
We will continue to monitor how these changes affect our rates of meeting our criteria.			
Next Assessment Cycle Plan (Please describe your assessment plan timetable for this outcome)			
We believe the best assessment cycle would be every two years since the first set of students under our curricular changes will likely have graduated by then.			

Student Learning Outcome 3

Student Learning Outcome	Students should be able to speak and write with mathematical maturity commensurate with that of a Masters graduate.		
Measurement Instrument 1	Masters thesis.		
Criteria for Student Success	Committee approval of the completion and defense of the masters thesis.		
Program Success Target for this Measurement	90%	Percent of Program Achieving Target	89%
Methods	All students choosing the thesis option must complete a rigorous masters thesis with the supervision of a member of our graduate faculty, and defend that thesis upon its completion to that faculty member and two other faculty that they choose to be on their committee. The committee must agree that the students has completed a rigorous thesis and defended it successfully. 4 students successfully defended their Master’s thesis. 4 more are scheduled to complete a Master’s thesis in the next two years. One student changed from the MS to the MA program after their first semester in the MS program.		
Measurement Instrument 2	Comprehensive exam.		
Criteria for Student Success	Successful completion of the comprehensive exam.		
Program Success Target for this Measurement	90%	Percent of Program Achieving Target	NA
Methods	No students took the comprehensive exam.		
Based on your results, circle or highlight whether the program met the goal Student Learning Outcome 3.			Met
Not Met			
Actions (Describe the decision-making process and actions for program improvement. The actions should include a timeline.)			
We are removing the comprehensive exam option from our program, and requiring each program student to complete and defend a masters thesis. The changes have been implemented for the 2020-2021 academic year.			
Follow-Up (Provide your timeline for follow-up. If follow-up has occurred, describe how the actions above have resulted in program improvement.)			
We will continue to monitor how these changes affect our rates of meeting our criteria.			
Next Assessment Cycle Plan (Please describe your assessment plan timetable for this outcome)			
We believe the best assessment cycle would be every two years since the first set of students under our curricular changes will likely have graduated by then.			