Assessment Report - Four Column

Eastern Oregon University

Program (CAS) Mathematics

Catalog Description: The BA/BS in Mathematics is based on the recommendations of the Committee on the Undergraduate Program in Mathematics (CUPM), a working committee of the Mathematical Association of America. These recommendations acknowledge the need for people trained in disciplined, logical reasoning and who understand the basic methods and models of the mathematical sciences and who are able to convey their mathematical knowledge orally and in writing. The result is a program that provides broad coverage of the main branches of mathematics and yet includes opportunities for elective examination of special topics such as probability and statistics, discrete mathematics, geometry, and areas of applied mathematics.

How Program serves the Mission: The mathematics program supports the mission of the university by providing the necessary mathematical and statistical support courses for students in many disciplines. These disciplines come from both the liberal arts and professional programs and include computer science, the physical and biological sciences, the social sciences, business and economics, multimedia, education, and health. We also offer courses that support students in EOU partner programs such as the OSU agricultural business program and the OHSU nursing degree. The program also plays a major role in the preparation of highly qualified teachers of mathematics for elementary, middle, and secondary schools. Graduates also find employment in the private sector. The program serves the region by promoting outreach activities. These include hosting the annual Regional High School Mathematics Contest and assisting in events such as Girls in Science and the Lego Robotics Competition.

Program Outcomes	Means of Assessment & Benchmark / Tasks	Data Analysis	Closing the Loop & Follow-Up
Program (CAS) Mathematics - Content Knowledge - Graduates will demonstrate a broad-based knowledge of mathematical content and technique. **Year(s) to be Assessed:** 2009-2010 2014-2015 **Outcome Status:** Active	**Description of Assessment:** Probability: 6 questions taken from 3 exams	07/12/2011 - Though one target goal was not met on this problem, it was through a misunderstanding of a single student, which was easily rectified. Students generally performed well on this question. **Benchmark Met:** Yes **Reporting Year:** 2009-2010 **Related Documents:** Fall 2009 Assessment	07/12/2011 - With a few exceptions students performed at or above target goals. Students seemed to have a solid grasp of concepts as all goals were met for the two ?conceptual problems? that were assessed. Three target goals failed to be met among the ?computational problems?. However two of these targets were missed due to a single student with an unsatisfactory performance. The third showed a deficiency in understanding how to apply Beyes? Theorem. An end-of-term assessment showed that further work on such applications seems to have been

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Program (CAS) Mathematics - Problem Solving - Graduates will demonstrate problem-solving skills in the context of mathematics, and the ability to apply techniques learned in the study of specific topics in new areas. **Year(s) to be Assessed:** 2010-2011 2014-2015 **Outcome Status:** Active	**Description of Assessment:** Modeling: modeling project, written paper	07/12/2011 - All targets were met for all four performance criteria. Of the ten students evaluated, only one showed unsatisfactory results for organization and quality and depth of problem. All ten students had satisfactory accuracy of content. The strongest results were in ?depth of content? for which eight of the ten students were judged to be excellent. **Benchmark Met:** Yes **Reporting Year:** 2010-2011 **High Impact Practice (HIP) - only choose one:** University Writing Requirement **Related Documents:** Math Fall 2010 Assessment	07/12/2011 - We appear to be doing a fine job helping students achieve the ?problem solving? outcome. This is verified not only by our assessment within the course, but externally, as three of the students from this course received an ?Oustanding? award for their efforts in the COMAP Mathematical Modeling Contest. No changes are deemed necessary based on these results.
Program (CAS) Mathematics - Inquiry and Analysis - Graduates will be able to employ the skills of independent, careful analysis of mathematical exposition. **Year(s) to be Assessed:** 2011-2012 2015-2016 **Start Date:** 07/01/2011 **Outcome Status:** Active	**Description of Assessment:** Structures: TBD	12/03/2012 - gdfgdf **Benchmark Met:** No **Reporting Year:** 2011-2012	
Program (CAS) Mathematics - Communication - Graduates will be able to use written and oral communication skills appropriate to mathematical exposition.	**Description of Assessment:** Seminar presentations and written paper **Assessment Type:** Capstone Assignment/Project	07/12/2011 - While all students completed the course with passing grades, the purposes of this assessment require a different standard, insofar as we use the assessment to push for improvements in our	07/12/2011 - Students do well on content depth, but we clearly have room for improvement in overall quality of their final products. We have made

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Year(s) to be Assessed: 2008-2009 2012-2013 **Outcome Status:** Active		curriculum and pedagogy. The assessment made clear the need for improvements, most particularly with increasing the quality of submitted papers, and with verbal communication in presentations. **Benchmark Met:** Yes **Reporting Year:** 2008-2009 **Related Documents:** Math Spring 2009 Assessment	adjustments to the course structure for 2009-2010 based on this assessment. The primary change will be to establish the beginning of research presentations several weeks earlier, by the fourth week of winter term. In addition, we will spend more time discussing the rubric for presentations, and provide more feedback to students from their weekly updates.
	Description of Assessment: Due to assess Communication 12-13	05/23/2013 - 80% of students reached the level of adequate or proficient overall. This is below the benchmark of 85% at adequate or proficient. Comments: 1) Several students were not clear on the meaning of the term "counterexample", which prevented them from answering some questions correctly. 2) Students did well on the computational aspects of the assignment, but sometimes interpreted their findings incorrectly or did not state their conclusions precisely. 3) 11 of 20 achieved adequate or proficient status in the area of "presents convincing evidence". That was the weakest result. The best areas were "focus and organization" and "tables and graphics" where 19 out of 20 reached adequate or proficient status. **Benchmark Met:** Yes **Reporting Year:** 2012-2013 **Related Documents:** Math 211 adequate.pdf Math 211 developing.pdf math 211 proficient.pdf math 211 rubric.pdf data tools math 211-fisher.docx	05/23/2013 - The students overall performed under the benchmark (80% versus 85%). Students performed fairly well on the first two criteria, but fewer reached the adequate or proficient level in providing evidence. In the future, I would change the assessment in these ways: 1) The prerequisite for Math 211 is Math 095, and many of these students have not been exposed to the ways in which we ``know'' mathematical statements to be true. More exploration of this might improve the results of the assessment. 2) Give more assignments similar to the assessment before the one that is evaluated to help students understand expectations and standards. 3) Make the assignment a longer-term project, with students submitting a draft for feedback, with the final product being turned in later after revision. 4) Having students write a short essay might

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			be a better format than solving a series of problems for an assignment designed to evaluate communication.
	Description of Assessment: Due to Assess Communication online 12-13	05/23/2013 - In Math 211, Foundations Elementary Math I, there were 24 students received a letter grade. Each student was required to start a thread in Blackboard's discussion board each week by either presenting a problem or asking a question from textbook's set of exercise problems and post at least one follow-up post to reflect his/her work. Also each student was required to post one response to classmate's thread. 50% of students performed at proficient and 38% of students at adequate totaling 88% meeting adequate/proficient level in "focus on communication." Students were evaluated for presenting their work to targeted audience. 54% of students performed at proficient and 41% of students at adequate totaling 96% meeting adequate/proficient level in ?evaluation of evidence?. Here the students were evaluated for providing work and/or justification using various mathematical properties. 67% of students performed at proficient and 25% of students at adequate totaling 92% meeting adequate/proficient level in ?editing?. 100% of students performed at adequate level for employing graphics. I did not place anyone in proficient level because students should to learn how to insert mathematical symbols and expressions but we faced some technical challenges in Blackboard. Overall students met institutional benchmark in all of the traits; however, performance in ?focus on communication? was below my expectation. There were some resistances to presenting their work in non-regular homework style many students were accustomed	05/23/2013 - My impression of students' overall performances was at the adequate level. I became aware of students' lack of mathematical writing skills and resistance to participate and engage in discussions. Their previous math courses were more likely algebra courses where students mostly submit their homework to their teachers to be graded. Communicating mathematically in writing to different audience (not teachers) was an unfamiliar and uncomfortable practice. For the following term (since the course is offered each term) I have rewritten the instructions of the assignment with more explicit expectations and created a video of how to include mathematical symbols and equations to improve their mathematical writing skills. I have edited the grading rubric to reflect the emphasis of discussion engagement and mathematical writing skills.

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		to. Most students coming into the course are used to submit work to teachers, but had little experience shifting their audience to peers. Students who were at the developing level in "focus on communication" wanted to treat posting as submitting "homework" problems as they had done in the previous math courses. They provided little justification and would not engage on discussions in their thread or in response to others. Lack of mathematical skills and inadequate understanding of the material may be one of the factors for their lack of motivations to engage themselves. Students who are at the adequate/proficient level had better understanding of the material and therefore felt comfortable presenting the problem/ideas with justifications. There was some confusion on what expected on the discussion board participation at the beginning of the term. Students were needed much clear and explicit instructions with specific examples of not only the nature of assignment itself but also how to use Blackboard effectively. It includes how to insert math symbols and expressions/equations using the equation editor. Also students needed the instructions and reminders on accessing the grading rubric after each week?s submission. I had been writing feedback on their posts, but some had been unaware of the existence of the rubric with written feedback of their performances. **Benchmark Met:** Yes **Reporting Year:** 2012-2013 **Related Documents:** data tools math 211-online.docx	
Program (CAS) Mathematics - Program Review - No Assessment - Program Review			

Program Outcomes	Means of Assessment & Benchmark / Tasks	Data Analysis	Closing the Loop & Follow-Up
Year(s) to be Assessed: 2013-2014 **Outcome Status:** Active			

Curriculum Map

Eastern Oregon University

Program (CAS) Mathematics

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Content Knowledge - Graduates will demonstrate a broad-based knowledge of mathematical content and technique.

* MATH 251 - MATH 251 - Calculus I*SMI
* MATH 252 - MATH 252 - Calculus II*SMI
* MATH 253 - MATH 253 - Calculus III*SMI
* MATH 311 - MATH 311 - Advanced Calculus
* MATH 341 - MATH 341 - Linear Algebra
* MATH 344 - MATH 344 - Modern Algebra I
* MATH 382 - MATH 382 - Structures Abstract Math
* STAT 243 - STAT 243 - Elementary Statistics

Problem Solving - Graduates will demonstrate problem-solving skills in the context of mathematics, and the ability to apply techniques learned in the study of specific topics in new areas.

* MATH 251 - MATH 251 - Calculus I*SMI
* MATH 252 - MATH 252 - Calculus II*SMI
* MATH 341 - MATH 341 - Linear Algebra
* STAT 243 - STAT 243 - Elementary Statistics

Inquiry and Analysis - Graduates will be able to employ the skills of independent, careful analysis of mathematical exposition.

* MATH 253 - MATH 253 - Calculus III*SMI
* MATH 311 - MATH 311 - Advanced Calculus
* MATH 344 - MATH 344 - Modern Algebra I
* MATH 382 - MATH 382 - Structures Abstract Math
* MATH 407 - MATH 407 - Seminar

Communication - Graduates will be able to use written and oral communication skills appropriate to mathematical exposition.

* MATH 311 - MATH 311 - Advanced Calculus
* MATH 341 - MATH 341 - Linear Algebra
* MATH 344 - MATH 344 - Modern Algebra I
* MATH 382 - MATH 382 - Structures Abstract Math
* MATH 407 - MATH 407 - Seminar
* STAT 243 - STAT 243 - Elementary Statistics

Program Outcomes - Assessment Cycle

Year(s) to be Assessed	Program Outcome Name	Unit Name
2008-2009	Communication	Program (CAS) Mathematics
2009-2010	Content Knowledge	Program (CAS) Mathematics
2010-2011	Problem Solving	Program (CAS) Mathematics
2011-2012	Inquiry and Analysis	Program (CAS) Mathematics
2012-2013	Communication	Program (CAS) Mathematics
2013-2014	Program Review - No Assessment	Program (CAS) Mathematics
2014-2015	Content Knowledge	Program (CAS) Mathematics
2014-2015	Problem Solving	Program (CAS) Mathematics
2015-2016	Inquiry and Analysis	Program (CAS) Mathematics