EASTERN OREGON UNIVERSITY

Program Portfolio
Mathematics
2010-2011

Description of Program

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.

The program seeks to inculcate in each student a strong background in the foundational content of contemporary mathematical practice and dialogue, including, but not limited to elementary algebra and calculus, statistics, linear and abstract algebra, and analysis.

The core requirements of the major currently include 40 credit hours of mathematics courses plus 4 credits of statistics and 4 credits of computer science. Students must also complete 20 credit hours of upper division electives within the major. For each of the three concentrations, specific electives are selected to guide students to classes that will most help them in their intended future careers. Students in the Mathematical Studies concentration (for future high school teachers) focus on geometry, discrete mathematics, and other topics more closely linked to subjects they are likely to be teaching. Students in the Applied Mathematics concentration take electives in statistics, programming, and mathematical modeling. Majors completing the Theoretical Mathematics concentration take a deeper look at the fundamental areas of abstract algebra and analysis which better prepares them for graduate studies.

Corresponding to the three concentrations, the Mathematics Program also offers three minors – a minor in Mathematics, a minor in Statistical Mathematics, and a minor in Mathematical Studies. The first two minors are available to any Eastern Oregon University student. The third is only available for those students majoring in Multidisciplinary Studies, a major for students intending to enter the field of elementary education.

How Program serves the Mission of the University

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.

Recent Programmatic Changes

Our most recent curricular changes were in the 2008-2009 school year, when we reorganized the elective offerings, altered our senior sequence, and extended our capstone from a two-term course to a year-long course.

The reorganization of electives was planned as a result of the recognition that our graduates tended to fall into three different categories – those who plan to teach high school mathematics, those who went on to graduate school, and those who went to work in industry. As part of this reorganization the mathematics program created three different concentrations within the major (described above).

Since the fall of 2008, the Math 407 capstone has been a full year course, earning four credit hours. Students enroll for one credit each of fall and winter terms and two credits during spring term. Fall term includes an overview of scholarship, as had been presented winter term prior to the change. The new time line requires students to identify their full project by early in winter term, with initial progress reports beginning during the second half of winter term. Spring term continues with each student making regular, but short, presentations. We have found that the requirement of these preliminary discussions provides the primary motivation that serves to help students focus their efforts and energy. The requirement of regular update presentations is proving to be effective in raising the standards for both scholarship and presentation. Our 2009 assessment of the "Communication" learning outcome alerted us that students need experience with oral presentations even prior to their capstone experience. This has led us to incorporate homework presentations into our senior sequence courses. The effectiveness of this will be determined next time the capstone is assessed in 2013.

The most recent changes have been restricted to increasing the number of sections of classes as demand has increased. One significant change in this direction is that we now offer Math 070 and Math 095 in an online format every term.

Vertical Curriculum Mapping: Mathematics PLOs

Course Levels	**Benchmark/ Expected Standard of Performance**	**1 Content Knowledge** (courses required of all majors)	**2 Problem Solving** (course required of all majors)	**3 Inquiry & Analysis** (course required of all majors)	**4 Communication** (course required of all majors)
	Program sets benchmark				
400-Level	Program sets scale			MATH 407	MATH 407
300-Level		MATH 341 MATH 382 MATH 311 MATH 344	MATH 341	MATH 382 MATH 311 MATH 344	MATH 341 MATH 382 MATH 311 MATH 344
200-Level		MATH 251 MATH 252 MATH 253 MATH 254 STAT 243	MATH 251 MATH 252 MATH 254 STAT 243	MATH 253	STAT 243
100-Level			CS 161		CS 161

I. Program Objectives/Outcomes

Graduates from the Mathematics Program will have demonstrated proficiency in the following four areas:

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

- **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.

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

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

Connections to the University Learning Outcomes (ULOs)

1. ***Breadth of Knowledge*** – Majors in mathematics demonstrate a breadth of knowledge via the General Education Curriculum and through the range of core courses in the major.

2. ***Inquire, Create and Communicate*** – As part of the mathematics core of courses, majors will take a capstone class that requires students to research a topic of interest to them, write a paper about the topic, and give a presentation of their paper to an audience.

3. ***Integrated Learning*** – Mathematics majors are required to take calculus and statistics classes which demonstrate how the language of mathematics is used to solve problems in other fields. Many majors also take elective courses in Probability, Operations Research, Mathematical Modeling, and Differential Equations which give them further practice in using mathematics as a tool for solving problems in other disciplines.

4. ***Community Engagement and Personal and Social Responsibility*** – Many students majoring in mathematics work as tutors in the EOU Learning Center. Others have worked as peer leaders in Math Excel courses designed as enrichment classes for pre-calculus level mathematics. Still others volunteer to help with various community events organized by EOU such as the Girls In Science event, the Lego Robotics Competition, and the Regional High School Mathematics Competition. Many students use their capstone research as a project for the annual EOU Spring Symposium, an event where students share their research with the community. Though we are confident that most, if not all, of our mathematics majors engage in community discourse or community service, we do not currently have a mechanism for guaranteeing that all of our majors satisfy this University Learning Outcome. Conversations are currently underway about how we may achieve this.

II. Four-Year Assessment Cycle: Mathematics

Year	Outcome to be Assessed
Spring 2009	#4 (Communication)
Fall 2009-2010	#1 (Content Knowledge)
2010-2011	#2 (Problem Solving)
2011-2012	#3 (Inquiry and Analysis)

III. Curriculum Assessment Plan

Year	Outcome	Course/ Milestone Activity	Assignment/ Task (done by students)	Assessment Tool (to measure outcome)	Standards/Levels of Achievement (i.e., developing, adequate, proficient)
Spring 2009	Communication	Capstone	seminar presentations and written paper	faculty evaluation by rubric	See tables below
Fall 2009	Content Knowledge	Probability	6 questions taken from 3 exams	faculty evaluation by rubric	See tables below
Fall 2010	Problem Solving	Modeling	modeling project written paper	faculty evaluation by rubric	See tables below
Spring 2012	Inquiry and Analysis	Structures	Yet to be determined in detail	Yet to be determined in detail	Yet to be determined in detail

See Key Programmatic Assessments section for rubrics and student sample

Degree Program Outcomes Assessment

Spring 2009

Degree Program: Mathematics
Outcome Assessed: Communication
Course/Activity: Math 407 (Capstone Seminar) / Final Projects and Presentations

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Target Performance	Targets Met
Student Essay				
Mastery of Content	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 75%
Quality of Paper	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	XXX 50%
Student Presentation				
Organization	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 75%
Verbal Communication	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	XXX 50%
Depth of Content	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 75%
Accuracy of Content	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 100%
Use of Media	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 75%

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student sa5mples

Explanation of Assignment / Activity / Prompt

Essays and presentations are the tangible product of students in the capstone course. Students began work on their research at the beginning of spring quarter. Each student made several in-class presentations over the quarter, as regular updates on the progress of their studies. Rough drafts of essays were submitted two weeks prior to the end of the quarter.

Analysis of Assessment Results

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 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.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

Students do well on content depth, but we clearly have room for improvement in overall quality of their final products. We have made 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.

Degree Program Outcomes Assessment

Fall 2009

Degree Program: Mathematics
Outcome Assessed: Content Knowledge
Course/Activity: Math 361 (Probability and Statistics) / Exam Questions

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Target Performance	Targets Met
Computational Problem (Law of Inclusion/Exclusion)	***Exam #1 Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***√ XXX (only 89%)***
Computational Problem (Bayes's Theorem)	***Exam #1 Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***XXX (only33%) √***
Conceptual Problem (Definition and Proof of the Law of Total Probability)	***Exam #1 Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***√ √***
Computational Problem (Probability Densities)	***Exam #2 Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***√ √***
Computational Problem (Bayes's Theorem)	***Final Exam Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***√ XXX (only 89%)***
Conceptual Problem (Events and Set Algebra)	***Final Exam Problem – rubric***	***1-4, % at 3 or 4 % above 1***	***66% at 3 or 4 100% above 1***	***√ √***

Note: See "Supporting Documentation" tab or for detailed records of the summary. The assessment representative for each department must archive supporting student samples

Explanation of Assignment / Activity / Prompt

QUESTION (for Law of Inclusion and Exclusion): An auto insurance company has 10,000 policy holders. Each of them is classified as either "male" or "female", "low risk" or "high risk", and "married" or "single". Of all the policyholders, 4800 are male, 2200 are high risk, and 6200 are married. Further 1200 are high-risk males, 3000 are married males, and 1500 are married and high-risk. Finally, 600 are high-risk, married, males. How many of the policyholders are low-risk, single women?

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
3	3	2	1

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.

Explanation of Assignment / Activity / Prompt

QUESTION (Bayes's Theorem): A fair die is rolled. If it comes up 1, 2, or 3, a fair coin is flipped. If it comes up a 4 or 5, two fair coins are flipped. If it comes up a 6, three fair coins are flipped. First determine the probability that, of whatever coin(s) are flipped, exactly one will show tails. Then use Bayes' Theorem to determine the probability that the die roll was a "1" given that exactly one flipped coin showed tails.

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
2	1	6	0

Student performance on this question was not up to an appropriate level. More time was spent on Beyes' Theorem with the intent to re-evaluate at the end of the term (see QUESTION #5 below).

Explanation of Assignment / Activity / Prompt

QUESTION (Definition and Proof of the Law of Total Probability): First give the definition of P(A|B) and explain what assumption must be made about B for this definition to make sense? Then prove our first version of the "Law of Total Probability" which said

$$P(F) = P(F|E)*P(E) + P(F|E^c)* P(E^c).$$

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
1	5	3	0

Though only one student showed exemplary performance, the class as a whole met both targets. Additional time spend on proper mathematical exposition while writing proofs could further boost results.

Explanation of Assignment / Activity / Prompt

QUESTION (Probability Densities): Suppose a random variable has the following density:

$f_X(z) = kx(x - 4)$ if $0 < x < 4$

0 otherwise

Determine the value of k.

How likely is it that this random variable produces a value less than 1?

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
6	1	2	0

Students performed well above targets interpreting and computing probabilities using densities.

Explanation of Assignment / Activity / Prompt

QUESTION (Bayes's Theorem): A box contains five light bulbs. All look alike, but four are standard light bulbs (with a lifetime that follows an exponential random variable with an average of 2 years) while one is an Edison Super-Delux Mega-Bulb (with a lifetime that follows an exponential random variable with an average of 4 years).
Suppose one of the bulbs is selected at random from the box. Given that it is still working eight years later, how likely is it that the selected bulb is the Edison Super-Delux Mega-Bulb?

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
3	4	1	1

This question was asked as a re-assessment of understanding of Bayes's Theorem after performances fell well short on the first exam. Generally students performed much better on this question than on the earlier question. One target was still not met, but this was due to a single student with an unsatisfactory performance.

Explanation of Assignment / Activity / Prompt

QUESTION (Events and Set Algebra): A die is rolled repeatedly. Let A_n, B_n, C_n, D_n, E_n, and F_n be the events that the n^{th} roll is a "1", "2", "3", "4", "5", or "6" respectively. In terms of the given events, what is the event that the first die rolled is even and the second die rolled is larger than four?

Analysis of Assessment Results

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
6	1	2	0

Students exceeded target performances on this question.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

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 effective.

Degree Program Outcomes Assessment

Fall 2010

Degree Program: Mathematics
Outcome Assessed: Problem Solving
Course/Activity: Math 323 (Mathematical Modeling) / Written Project

Summary of Assessment Results

Performance Criteria	Assessment Method	Measurement Scale	Target Performance	Targets Met
Student Modeling Project				
Organization	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 90%
Quality of Paper	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 90%
Depth of Content	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 90%
Accuracy of Content	***Attached Rubric***	***1-3, % at 2 or 3***	***66% at 2 or 3***	√ 100%

Explanation of Assignment / Activity / Prompt

As a UWR (University Writing Requirement) course, a significant portion of the content of this course is the creating and revising of written reports detailing mathematical models designed to solve specific problems. One of those reports will be assessed for organization, quality, and depth and accuracy of content.

Analysis of Assessment Results

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.

Closing the Loop: Strengths, Weaknesses, Conclusions, Recommendations

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.

Degree Program Outcomes Assessment

Spring 2012

Degree Program: Mathematics
Outcome Assessed: Inquiry and Analysis
Course/Activity: Math 382 (Structures of Abstract Mathematics)

Explanation of Assignment / Activity / Prompt

Yet to be determined in detail. The Math 382 course will be assessed in Spring 2012 before which time an appropriate assessment tool will be finalized.

Key Programmatic Assessments

Communication Rubrics
Assessment in Math 407, the senior capstone seminar

Rubric for Senior Capstone Presentation

CRITERIA	EXCELLENT	SATISFACTORY	UNSATISFACTORY
Organization	Presentation was well organized with a smooth flow. The listeners could easily follow the ideas and logic.	Presentation showed an acceptable degree of organization, but with some awkwardness to the flow. Main ideas could be followed, but only with effort.	Organization was minimal or absent. Major ideas were lost on the listeners due to the poor flow of the presentation.
Effectiveness of Verbal Communication	Speech was very articulate, and grammatically correct. Speaker kept the listeners' attention. Mathematical terms were used accurately and appropriately.	Speech flowed reasonably well with some minor breaks or grammatical errors. Mathematical terms were, with a few exceptions, used accurately and appropriately.	Speech was awkward and distracted the listeners from the main ideas of the talk. Mathematical terms were consistently misused.
Depth of Content	Content went well beyond a rudimentary understanding while remaining accessible to upper division math majors.	Content showed appropriate depth, though too much time or focus was spent on simple rudimentary ideas.	Content lacked depth. The presentation was not a level that should challenge upper division math majors.
Accuracy of Understanding	Presenter demonstrated a solid understanding of all major ideas of the talk. Presenter seemed well prepared to answer listener questions.	Presenter demonstrated a satisfactory degree of understanding, though was occasionally shaky on the details and unsure of the answers to listeners questions.	Presenter showed a lack of understanding of major ideas within the talk.
Effective use of Media	Use of classroom media-chalkboard, transparencies, computer projection, etc.- was well coordinated and effectively used to provide a smooth pacing of the talk.	Noticeable awkwardness in the use of media (such as poor blackboard technique, small fonts on transparencies, or awkward transitions among media) that took away from the overall effect of the talk without losing major aspects of the content.	Substantial awkwardness in the use of media that significantly detracted from the audience's understanding of major ideas within the talk.

Rubric for senior capstone paper

CRITERIA	EXEMPLARY	SATISFACTORY	UNSATISFACTORY
Mastery of the subject	The content of the paper went well beyond a rudimentary understanding of the topic. Integrates and applies basic mathematical concepts and theorems	Content showed appropriate depth, though too much of the paper was spent on simple, rudimentary ideas	Content lacked depth. The paper was written at a level of a beginning undergraduate student. Lacks understanding of basic mathematical concepts and theorems
Quality of the written paper	Paper was well organized, succinct, and grammatically correct. Mathematical terms were used accurately and appropriately	Paper showed an acceptable degree of organization, overlooks some information, or has some grammatical errors. Mathematical terms were, with a few exceptions, used accurately and appropriately	There was minimal or no organization to the paper. Mathematical terms were consistently misused

Content Knowledge General Rubrics
(Question specific rubrics are built from these general forms and are provided below along with student samples).

General Rubric for Computational Problem

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
Solves the problem correctly with all steps clearly indicated. Clear explanation of the validity of non-obvious steps is given.	Solves the problem correctly, or fails due to no more than one very minor error. Little or no explanation for steps is provided.	Demonstrates a reasonable approach to the problem, which fails due to a major computational error, multiple minor errors, and/or missing steps.	Fails to demonstrate a reasonable approach to the problem.

General Rubric for Conceptual Problem

EXEMPLARY	PROFICIENT	MARGINAL	UNSATISFACTORY
Provides a well-written, detailed, and accurate description of the concept using appropriate notation and terminology.	Provides an essentially accurate description of the concept, perhaps lacking detail, with no more than a few minor errors in notation and/or terminology.	Provides a confusing or incomplete description of the concept, which nevertheless contains some of the key ideas.	Fails to address any of the main ideas of the concept accurately.

Problem Solving Rubric
Assessment for Math 323 Mathematical Modeling Paper

CRITERIA	EXCELLENT	SATISFACTORY	UNSATISFACTORY
Organization	Report was well organized with a smooth flow. Readers could easily follow the concepts and conclusions.	Report showed an acceptable degree of organization, but with some awkwardness to the flow. Main ideas and conclusion could be followed, but only with effort.	Organization was minimal or absent. Major ideas and conclusions were lost on the readers due to the poor flow of the presentation.
Quality of the written paper	Report was grammatically correct. References were clearly and appropriately documented, and all sections were present and clearly labeled.	Report was grammatically correct with a few exceptions. References and all appropriate sections were present.	Report had persistent grammatical errors. References or sections were lacking.
Depth of Problem	Selected problem was sufficiently complex and intricate to make an in-depth study a course-appropriate challenge.	Selected problem was non-trivial, but lacked complex details making it solvable with only superficial analysis.	Selected problem was insufficiently complex. Effort required to solve it was not course-appropriate.
Accuracy of Content	Report demonstrated a solid understanding of all major ideas of the talk. Mathematical and technical terms were used accurately and appropriately.	Report demonstrated a satisfactory degree of understanding, though was occasionally shaky on the details. Mathematical and technical terms were, with possibly a few exceptions, used accurately and appropriately.	Report showed a lack of understanding of major ideas within the talk. Mathematical and technical terms were consistently misused.

Student Accomplishments

Several of our students have been successful competing in national and international competitions in both theoretical and applied mathematics. Hieu Do was among the top finishers in the Virginia Tech Regional Mathematics Competition in 2008 and placed among the top 500 students nationally in the William Lowell Putnam Competition that same year.

We have also had students achieve high results in the COMAP Mathematical Modeling Contest. In 2005 a team which included math major Voja Petrovic and math minors Jason Vielma and Zach Goode received a "Meritorious" award for their modeling paper. In 2006 a team of three math majors – Ihsane Bikri, Christopher Cox, and Ivan Simeonov also received a "Meritorious" award for their efforts. Most recently, in 2011, the team of Rachel Burton, Jadon Herron, and Alex Macovy-Gomez received an "Outstanding" award for their paper, one of only 4 teams in the world to achieve such a high mark.

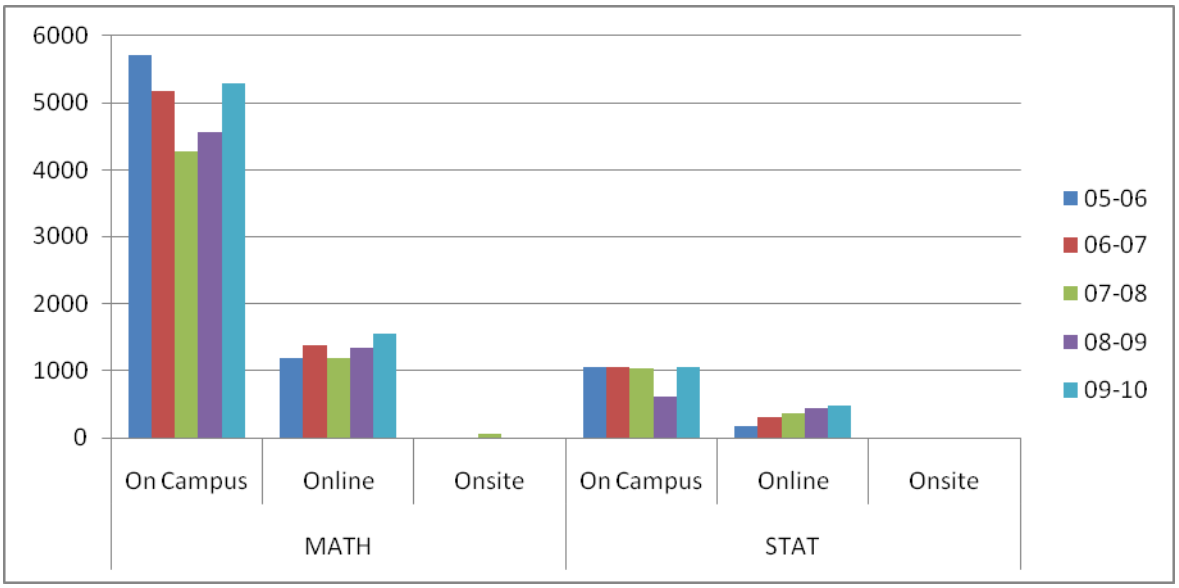
We have had several recent students see success in graduate programs. Marianna Jagodina and Ihsane Bikri both earned Master's Degrees (Marianna at Cal State Long Beach and Ihsane at Oregon State University). Ihsane now teaches math at a community college in Nebraska. Mariana has also taught at a community college (in California) and has passed two of the actuarial exams needed to become a candidate for the Society of Actuaries. Recent graduates currently in post-baccalaureate programs include Hieu Do (at Oregon State University), Matt Lewis (at Western Washington University), Justin Hilyard (at Notre Dame), Voja Petrovic (at Utah State), and Ivan Simeonov (in the Statistics Ph.D. program at Penn State).

Many of our graduates major in mathematics with the intent to teach high school. Most of these students take advantage of EOU's MAT program in the College of Education. A short list of those who have gone on to a successful teaching career include Adil Abounadi (at Central High School in Independence, OR), Mike Lindsay (at Hockinson High School near Vancouver, WA), Nick Zolotoff (at Newburg High School in Newburg, OR), Michelle Taisican (teaching in Micronesia), Amanda Potter (at the International School in Beaverton, OR), and Tyler Davis (in Stanfield, OR). With regard to the Program's responsibility and goal of effectively preparing teachers, we refer to the data provided by the College of Education on student success in the Praxis examinations. Our last survey of those records showed that from 2001-2007 all EOU mathematics graduates entering the EOU MTE program had successfully passed the required Praxis exams.

Enrollment and Program Performance

Eastern Oregon University

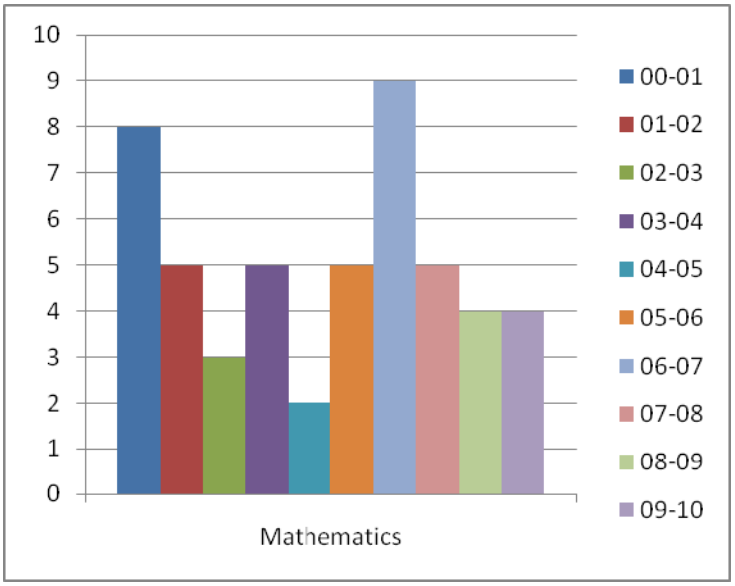
		Data				
Prefix	Campus	05-06	06-07	07-08	08-09	09-10
MATH	On Campus	5706	5170	4278	4564	5300
	Online	1196	1373	1182	1346	1556
	Onsite	0	0	72	0	0
MATH Total		6902	6543	5532	5910	6856
STAT	On Campus	1049	1052	1036	624	1051
	Online	172	321	369	451	482
	Onsite	0	0	0	0	0
STAT Total		1221	1373	1405	1075	1533
Grand Total		8123	7916	6937	6985	8389



Commentary on Enrollment and Graduate Trends

5 Year Graduation by Major

	Data									
Bachelors	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
Mathematics	8	5	3	5	2	5	9	5	4	4
Grand Total	8	5	3	5	2	5	9	5	4	4



Program and Course Scheduling Requirements

The current schedule of courses includes the following sections. Year One represents a year beginning with an even number (2012 – 2013) and Year Two represents an even numbered school year.

FALL – Year One – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040 (4)		12 (3 per section)	80 (20 per section)
Math 070 (6)		24 (4 per section)	120 (20 per section)
Math 095 (6)		24 (4 per section)	180 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
GEN ED			
Math 105		4	25
Math 211		4	25
Math 212		4	25

MAJOR/MINOR			
Stat 243 (2) * ^		8 (4 per section)	65 (30 – 35 per section)
Math 251 (2) * ^		8 (4 per section)	50 (20 – 30 per section)
Math 321		4	10
Math 323		4	8
Math 341 ^		4	15
Math 344		4	6
Math 407		1	6
TOTAL (in-load)		117 load hours	735 students (estimated)
(estimate)		24.3 SCH/load hour	2842 SCH (estimated)

**** indicates that this is also a GenEd class.***
^ indicates that this is also a service class.

WINTER – Year One – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040 (2)		6 (3 per section)	40 (20 per section)
Math 070 (5)		20 (4 per section)	100 (20 per section)
Math 095 (5)		20 (4 per section)	150 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
Math 112 (2)		8 (4 per section)	60 (25 – 35 per section)
GEN ED			
Math 105		4	25 (25 – 30 per section)
Math 211		4	25
Math 213		4	25
Math 241 ^		4	25
MAJOR/MINOR			
Stat 243 (2) * ^		8 (4 per section)	65 (30 – 35 per section)
Stat 352 ^		4	25
Math 252(2) * ^		8 (4 per section)	50 (20 – 30 per section)
Math 254		4	10
Math 310		4	10
Math 452		4	8
Math 445		4	6
Math 407		1	6
TOTAL (in-load)		115 load hours	752 students (estimated)
(estimate)		25.6 SCH/load hour	2942 SCH (estimated)

SPRING – Year One – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040		3	10
Math 070 (2)		8 (4 per section)	40 (20 per section)
Math 095 (3)		12 (4 per section)	90 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
Math 112		4	35
Math 231		4	20
GEN ED			
Math 212		4	25
Math 213		4	25
Math 241 ^		4	25
MAJOR/MINOR			
Stat 243 (2) * ^		8 (4 per section)	65 (30 - 35 per section)
Stat 352 ^		4	20
Math 251 * ^		4	15
Math 253 * ^		4	25
Math 311		4	6
Math 310		4	10
Math 338		4	10
Math 382		4	10
Math 407		2	6
TOTAL (in-load)		93 load hours	557 students (estimated)
(estimate)		23.7 SCH/load hour	2206 SCH (estimated)

**** indicates that this is also a GenEd class.***

^ indicates that this is also a service class.

FALL – Year Two – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040 (4)		12 (3 per section)	80 (20 per section)
Math 070 (6)		24 (4 per section)	120 (20 per section)
Math 095 (6)		24 (4 per section)	180 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
GEN ED			
Math 105		4	25
Math 211		4	25
Math 212		4	25
MAJOR/MINOR			
Stat 243 (2) ***** ^		8 (4 per section)	65 (30 – 35 per section)
Math 251 (2) ***** ^		8 (4 per section)	50 (20 – 30 per section)
Math 311		4	6
Math 321		4	10
Math 341 ^		4	15
Math 361 ^		4	8
Math 407		1	6
TOTAL (in-load)		117 load hours	735 students (estimated)
(estimate)		24.3 SCH/load hour	2842 SCH (estimated)

**** indicates that this is also a GenEd class.***
^ indicates that this is also a service class.

WINTER – Year Two – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040 (2)		6 (3 per section)	40 (20 per section)
Math 070 (5)		20 (4 per section)	100 (20 per section)
Math 095 (5)		20 (4 per section)	150 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
Math 112 (2)		8 (4 per section)	60 (25 – 35 per section)
GEN ED			
Math 105		4	25 (25 – 30 per section)
Math 211		4	25
Math 213		4	25
Math 241 ^		4	25
MAJOR/MINOR			
Stat 243 (2) * ^		8 (4 per section)	65 (30 – 35 per section)
Stat 352 ^		4	25
Math 252(2) * ^		8 (4 per section)	50 (20 – 30 per section)
Math 355		4	10
Math 412		4	6
Math 407		1	6
Math 483		4	6
TOTAL (in-load)		115 load hours	738 students (estimated)
(estimate)		25.2 SCH/load hour	2894 SCH (estimated)

**** indicates that this is also a GenEd class.***
^ indicates that this is also a service class.

SPRING – Year Two – On Campus

COURSE (sections)		LOAD (per section)	EST. ENROLLMENT (per section)
SERVICE (only)			
Math 040		3	10
Math 070 (2)		8 (4 per section)	40 (20 per section)
Math 095 (3)		12 (4 per section)	90 (30 per section)
Math 111 (3)		12 (4 per section)	120 (35 – 45 per section)
Math 112		4	35
Math 231		4	20
GEN ED			
Math 212		4	25
Math 213		4	25
Math 241 ^		4	25
MAJOR/MINOR			
Stat 243 (2) * ^		8 (4 per section)	65 (30 - 35 per section)
Stat 352 ^		4	20
Math 251 * ^		4	15
Math 253 * ^		4	25
Math 338		4	10
Math 344		4	6
Math 382		4	10
Math 407		2	6
Math 462 ^		4	8
TOTAL (in-load)		93 load hours	555 students (estimated)
(estimate)		23.6 SCH/load hour	2198 SCH (estimated)

**** indicates that this is also a GenEd class.***

^ indicates that this is also a service class.

Typical yearly on-line schedule and approximate enrollment:

Fall (online)		Credits	Approximate Enrollment
Math 070 (2)		8 (4 per section)	40 (20 per section)
Math 095		4	30
Math 105		4	25
Math 111		4	30
Math 211		4	25
Math 212		4	20
Math 213		4	15
Math 239		2	5
Stat 241		2	30

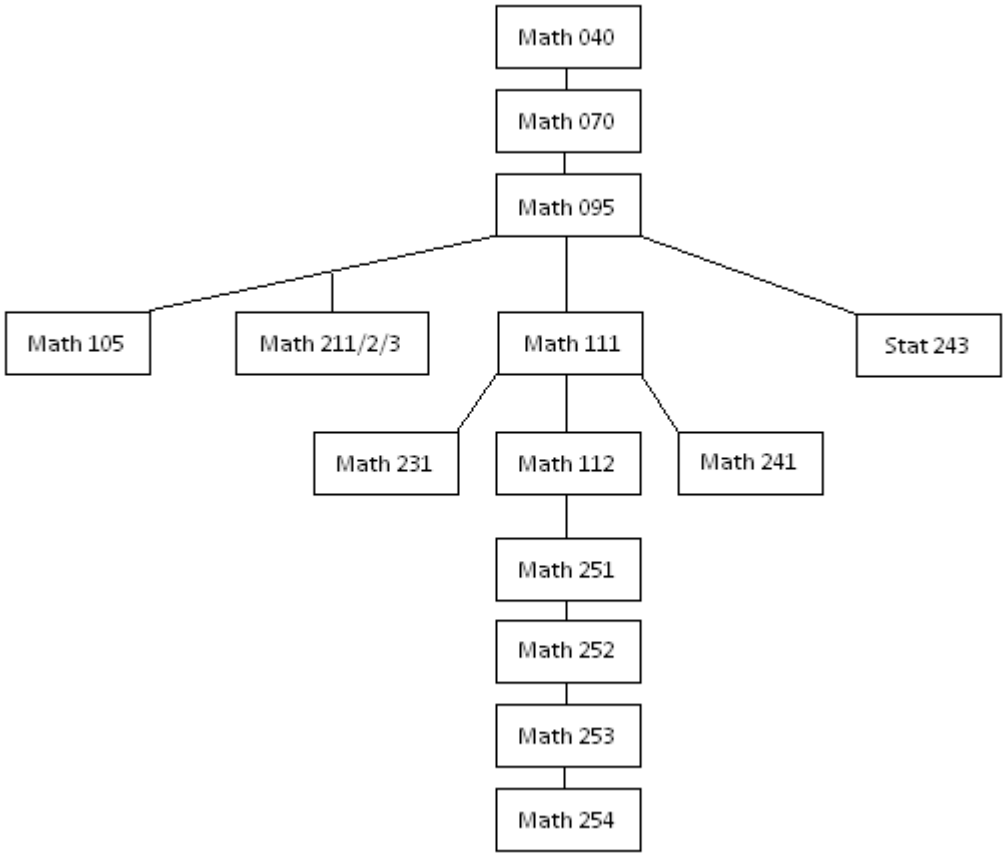
Winter (online)			
Math 070		4	20
Math 095		4	30
Math 105		4	25
Math 111		4	30
Math 211		4	25
Math 212		4	20
Math 213		4	15
Math 239		2	5
Math 240		2	5
Stat 241		2	30
Stat 242		2	20
Stat 244		1	15

Spring (online)			
Math 070		4	20
Math 095		4	30
Math 105		4	25
Math 111		4	30
Math 211		4	25
Math 212		4	20
Math 213		4	15
Math 240		2	5
Stat 242		2	20
Stat 244		1	15

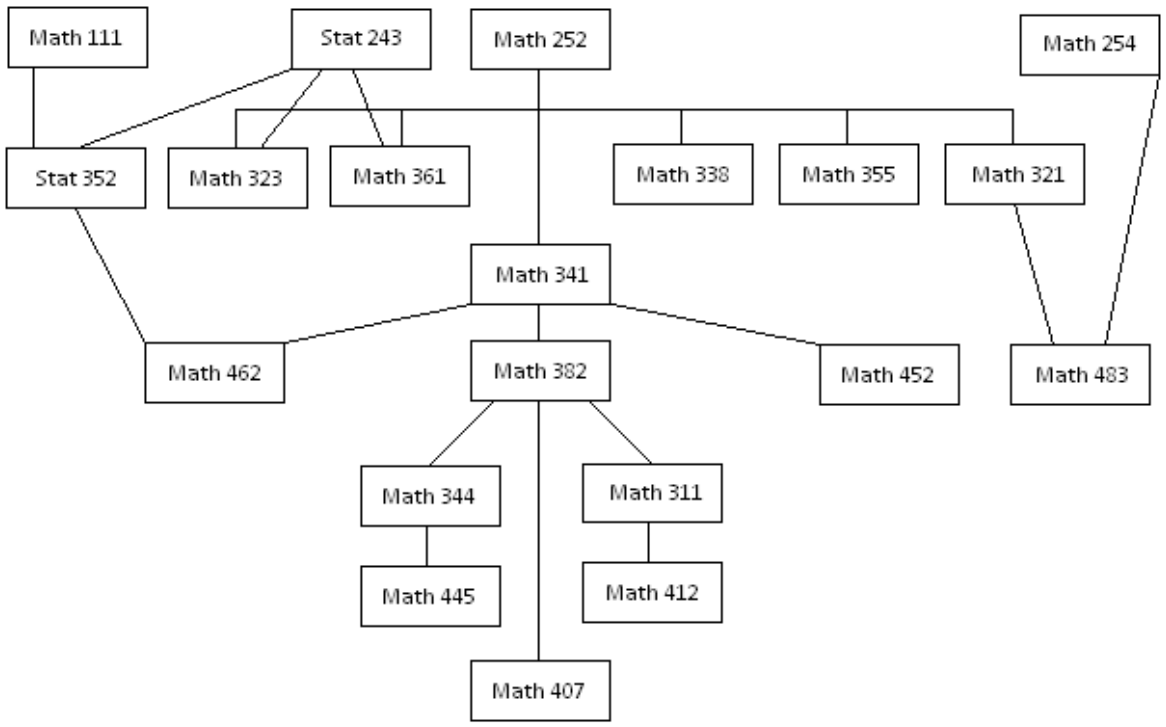
Total Credit Hours Taught Per Year: 431
Approximate SCH Per Year: 10,000

Prerequisite Tree of Course Offerings:

Lower Division and Pre-College Level



Upper Division



Math Faculty:

A total of thirteen faculty teach courses for the Mathematics Program. These include three tenure-line faculty, all with Ph.D.s in Mathematics, two fixed-term Assistant Professors also with Ph.D. in Mathematics, four Instructors teaching over 0.5 FTE, and two Instructors teaching less than 0.5 FTE. Two faculty members from other programs (Physics and Education) have some of their load assigned to mathematics classes.

Dr. John Thurber (Professor of Mathematics) received his Ph.D. from Notre Dame in 1994 and has been teaching at EOU since that time. He works in the field of Logic and his most recent publication "Computability on Linear Orderings Enriched with Predicates" was published in 2009 in *Algebra and Logic*. Dr. Thurber served as the Chair of the Pacific Northwest Section of the Mathematical Association of America from 2007 – 2009. He is also a contributor to SAGE, an open-source mathematical software package.

Dr. Stephen Tanner (Associate Professor of Mathematics) received his Ph.D. from the University of Washington in 1999 and has been working at EOU since 2002. His research is in the fields of Probability and Analysis and he published "Non-tangential and Probabilistic Boundary Behavior of Pluriharmonic Functions" in the journal *Annals of Probability* in 2006. He is currently writing a textbook "Probability and Statistics with Simulation" and has served as a volunteer statistical consultant for employees of the City of La Grande and the Oregon Department of Transportation.

Dr. Amy Yielding (Assistant Professor of Mathematics) received her Ph.D. from Washington State University in 2009 and has been at EOU since that time. She was a co-author of "Probing the Evolution of the Galaxy Interaction / Merger Rate Using Collisional Ring Galaxies" published in the *Astrophysical Journal* in 2004. Her current research in Linear Algebra has led to a paper "Complex Spectrally Arbitrary Zero-nonzero Patterns", accepted for publication in *Linear Algebra and Multilinear Algebra*. She has also completed two additional papers currently under review for publication.

Dr. Bryan Fisher (Assistant Professor of Mathematics) received his Ph.D. from the University of Oregon in 1995. He began teaching online classes at EOU in 2006 and has been a full-time teacher of online and on-campus classes since 2007. His fixed-term duties do not include any expectation of research or publication.

Dr. Dan May (Assistant Professor of Mathematics) received his Ph.D. from the University of Wyoming in 2010. He was hired this year as a sabbatical replacement for John Thurber and will be continuing with the university for at least two more years.

Faculty at the Instructor rank typically do not have graduate degrees in Mathematics, with the exception of Gordon Gregersen who has a Master's Degree in the discipline. Most faculty at this rank teach developmental (pre-100 level) courses and are hired based on their prior experience teaching at the high school level. We have four full-time Instructors (Kay Firor, Gordon Gregersen, Kazue Marlette, and Patty Sandoz) and one part-time Instructor (Mary Brown). Though nearly all of our faculty teach some courses online, we have only one part-time Instructor (Sharron Shannon) who teaches exclusively online.

Finally, Dr. Anthony Tovar of the Physics Program and Dr. John Knudsen-Martin of the College of Education are tenure-line faculty from other programs, each of whom has 0.33 FTE of their standard load assigned to mathematics courses.

SUMMARY/RECOMMENDATIONS:

During the past two years, the Mathematics Program has undergone substantial growth. Our SCH for both the online and on-campus modalities are at record highs. Similarly our average enrollment in upper division math classes is higher than it has ever been, our number of declared majors has risen, and it seems likely that in one of the next two years we will see our number of mathematics graduates hit a record high as well.

Our biggest challenge for the near future involves figuring out how to offer enough sections of service courses to meet the demand of a growing EOU student population while controlling the amount of overload expected of our faculty. The hiring of Dan May to a two-year position will help a great deal with this problem in the short term, but the fact remains that, even with this new hire, nearly all of our faculty will teach some courses on an overload basis. This makes it difficult to consider developing new classes in any

modality since it would require faculty members to take on additional FTE beyond the overload they already teach. Recent collaborative efforts with the College of Education are likely to lead to further enrollment growth. Under the leadership of John Knudsen-Martin, the College of Education and the Mathematics Program have jointly developed MESA (Mathematics Education Scholarship Awards) to help bring students interested in being future high school mathematics teachers to EOU.

A second challenge faced by the program is the scarcity of tenure lines. This coming year there will be 13 faculty teaching mathematics classes at EOU and only 3 of those 13 are in tenure lines within the Mathematics Program. To guarantee that we have the resources to put toward advising and curricular development, programmatic and institutional service, outreach, and research, it is our hope and expectation that some fixed term positions will be converted to tenure lines as resources become available.

Load/Faculty On Campus

The Provosts Office will help make these calculations for each major/minor. We will provide the raw data and computations for these areas. Prepares should make notes or – provide clarifications if the data are inadequate to communicate the entire truth.

Based on the 2008-2009 SCH, the ratio of SCH to faculty in MATH prefix courses is ----
Student load hours/---- FTE = ------ load hours per faculty member.

Total SCH: 5,910

ON Campus SCH: 4,564

ONLINE SCH: 1,346

ON SITE SCH :0

SCH/Faculty ratios:

On campus (--------SCH/-------- FTE) ------- SCH per faculty member

Based on the 2008-2009 SCH, the ratio of SCH to faculty in STAT prefix courses is ----
Student load hours/---- FTE = ------ load hours per faculty member.

Total SCH is: 1,075

ON Campus SCH: 624

ONLINE SCH: 451

ON SITE SCH:0

SCH/Faculty ratios:

On campus (--------SCH/-------- FTE) ------- SCH per faculty member

Administrative Review (Dean Marilyn Levine)

Administrative Assessment of program portfolios will consist of three areas of commentary: assessments conducted relating to student learning outcomes; comments on enrollment indicators; program goals and observations. If appropriate other observations will be offered.

1 . Assessment of Program Outcomes:
The selection and breadth of the assessments was a strength. In the Communication (Math 407) analysis, there needs to be more depth as to possible program implications that outline what kind of improvements are needed, other than earlier attention. Mathematics faculty might explore more frequent direct training in oral presentation, or perhaps assign materials on displaying visual data as some possible additions to their plans. The rubric for the capstone presentation was excellent.

2. Enrollment Indicators:
Although the mathematics sch and graduation rate has declined, the Mathematics faculty have been stretched delivering program, general education courses and developmental mathematics courses. The faculty has been agile in working with all units to rationally plan course offerings, in particular these past two years when needs have shifted between delivery areas.

3. Program Goals and Observations:
Although the portfolio does not have a summary section, I would highlight two areas that need focus. First, strengthening and recruiting for the recent program changes that the Mathematics faculty have developed and put into the curriculum. Secondly, a longitudinal understanding of course needs and offerings.
Another area that should be addressed in planning is the development of collaborative initiatives with the College of Education to recruit more students in STEM.

Other Observations:
The mathematics faculty have been challenged with two faculty resigning amidst a major university re-organization. The focus on serving the program and broader institutional needs is the challenge they face.
Finally, in terms of the development of the portfolio, the mathematics faculty need a summary and recommendation section. I also would recommend an expansion on the mathematics faculty with short biographies and accomplishments mentioned.