Math
Annual Assessment 2016-2017
Created on the Assessment Insight System

Annual Assessment

Mathematics

Program Profile

Program Mission Statement
Please insert your program mission statement here

The mission of the Mathematics program is to provide an environment where students can learn and become accomplished users of Mathematics and Mathematical application. The program contributes to the development of students as Mathematical thinkers, enabling them to become life-long learners, to continue to develop in their chosen professions, and to function as productive citizens.

Program Data

Delivery Method

Traditional On Campus (selected)
Online
Hybrid

Students Majors 2015-2016

4

Student Minors 2015-2016

4

Student Majors 2016-2017

5

Student Minors 2016-2017

4

Concentrations 2015-2016
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

Concentrations 2016-2017
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

Student Demographics
Program goals for student retention, persistence and degree completion are? What do the persistence numbers mean to the faculty in the program? Are your persistence numbers what you expected? If not, how could the numbers be improved? What is the optimal enrollment for the program?

Is the Program Externally Accredited

Yes

No (selected)

External Accreditation
Name the Accrediting Agency or entity including the last review/approval. Is there an accrediting body for the field of study? If yes, what is the name of the group. Is the program seeking accreditation?If no, why?

There is no outside accreditation for Mathematics.

Program Assessment

Standard/Outcome

Identifier	Description
WWU2016.1	Major Field Competence: Students will demonstrate excellence in an academic or professional discipline, and engage in the process of academic discovery.
WWU2016.2	Ethics: Students will exhibit values and behaviors that address self- respect and respect for others that will enable success and participation in the larger society.
WWU2016.3	Self-Liberation: Students will develop an honest understanding and appreciation of themselves and others resulting in an ability to make individual decisions.
WWU2016.4	Lifelong Education: Students will possess an intellectual curiosity and desire for continual learning both within and beyond formal education in preparation for participation in a global society.

Additional Standards/Outcomes

Identifier	Description
MAT.1	Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large.
MAT.2	Model rates of change and accumulation of various quantities and find conditions under which those quantities are optimized in both discrete and continuous settings.
MAT.3	Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.
MAT.4	Analyze situations involving multiple objects and constraints using multidimensional space.
MAT.5	Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.
MAT.6	Exhibit competence in various methods of analytic proof.
MAT.7	Accurately use algorithms in appropriate contexts.
MAT.8	Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.

General Education Alignment to Program
How do the General Education criteria align with the Program Objectives? What courses within your program build upon skills learned in general education courses (please list the program course and the general education criteria). The General Education clusters are: Critical Analysis, Creative Expression, Quantitative Inquiry, and Society & the Individual. See attached for more detailed breakdown.

Communication: Mathematics majors need to have communication skills to present steps in a problem clearly. They also need to be able to communicate their understanding of Mathematical concepts to others, both in written and spoken form.

Critical Thinking: Critical thinking is required in all Mathematics courses to analyze and construct Mathematical proofs of concepts.

Meaning: Students are required to read chapters in their textbooks in all courses, and identify central themes and underlying meaning. They often need to identify central themes of individual courses as well.

Ethics: Ethics is often a major concern in Statistics courses. Data should not be modified to meet the desired goals, nor should testing processes be developed to achieve a certain goal.

Historical Perspective: Mathematics is a sequential process, so the historical perspective on how these processes are achieved is often studied. Also, we often investigate particular results or theorems and the process of their development.

Fine Arts: Mathematics is often a visual process, requiring an understanding of geometrical shapes and curves. While artistic ability is not always required for this, it can assist in visualizing these concepts.

Natural Science: In the Mathematics courses, applications to other disciplines are often studied. Fields of natural science such as Physics and Biology frequently require Mathematical concepts.

Social Science: Statistics are often needed to analyze data collected in Social Sciences such as Psychology and Sociology. Also, economics often requires analyzing financial data.

Diversity: Many Mathematical concepts were developed by cultures other than our own. Mathematics is often considered the "universal language", meaning it is the result of the collective human experience.

(HLC 4B1)

GE_Cluster_Descriptions_FINAL_Version_Approved.docx

Curriculum Map

A - Assessed
I - Introduced
R - Reinforced
M - Master

CURRICULUM MAP

	MAT 124	**MAT 214**	**MAT 215**	**MAT 224**	**MAT 312**	**MAT 313**	**MAT 314**	**MAT 324**	**MAT 325**	**MAT 422**	**MAT 423**	**Student Performance Review**
MAT.1 Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large.	I	R	R	R	R	R	R	M	M	M	M	A
MAT.2 Model rates of change and accumulation of various quantities and find conditions under which those quantities are optimized in both discrete and continuous settings.	I	R		R	M	R						
MAT.3 Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.	I	R	R	R	R	R	R	M	M	M	M	A
MAT.4 Analyze situations involving multiple objects and constraints using				I, A, M		R	R					

multidimensional space.												
MAT.5 Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.	I	R		R	R	M, A						A
MAT.6 Exhibit competence in various methods of analytic proof.	I	R	R	R	R	R	R	M	M	M	A	A
MAT.7 Accurately use algorithms in appropriate contexts.			I			R			M, A			A
MAT.8 Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.	I	R		R	R	R	A, M	R	R			A

Assessment Findings

Assessment Findings for the Assessment Measure level for CURRICULUM MAP

MAT.1 Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large.

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric been met yet? Met	All five of the Mathematics majors received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

MAT.3 Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Presentation	Has the criterion 80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation been met yet? Met	All five of the Mathematics majors received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

MAT.4 Analyze situations involving multiple objects and constraints using multidimensional space.

Mat 224				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion 80% of students will achieve a score of 80 percent or higher on the Calculus III final exam been met yet? Met	Four of the five students enrolled (80%) achieved a score of 80 percent or higher on the Calculus III final exam. If only Math majors are included, three of four (75%) achieved the 80 percent threshold.		

MAT.5 Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.

Mat 313				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion 80% of students will achieve a score of 80 percent or higher on the Mathematical Statistics final exam been met yet? Met	All five of the students enrolled (100%) achieved a score of 80 percent or higher on the Mathematical Statistics final exam.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation been met yet? Met	All five of the Mathematics majors received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

MAT.6 Exhibit competence in various methods of analytic proof.

Mat 423				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion 80% of the students will achieve a B grade or higher on the final exam been met yet? Not met	MAT 423 was not offered in the 2016-17 school year.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation been met yet?	All five of the Mathematics majors received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

	Met			

MAT.7 Accurately use algorithms in appropriate contexts.

Mat 325				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion 80% of the students will achieve a B grade or higher on the class project been met yet? Met	100% (5 of 5 students) received a B grade or higher on the MAT 325 Numerical Analysis project.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation been met yet? Met	All five of the Mathematics majors received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

MAT.8 Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.

Mat 314				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Case Study	Has the criterion 80% of the students will achieve a score of 75 or higher on this project been met yet? Not met	MAT 314 was not offered as a regular class in the 2016-17 school year.		

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% of the students	All five of the Mathematics majors		

	will receive a score of 3 or higher on a 4 point scale for portfolio presentation been met yet? Met	received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.		

Analysis of the Assessment Process
Describe your assessment process; clearly articulate how the program is using course work and or assessment day activities for program assessment. Note any changes that occurred to that process since the previous year. Discuss what activities were successful at assessment and which ones were not as helpful and why. Please include who met to discuss the changes (unless you are a program of one person) and when you met. – Include a discussion on the process for collection and analysis of program data.

Analysis of Assessment:

The process of the student portfolio and individual interview has worked well for the Mathematics majors. It allows them to reflect on their prior coursework and to practice interview skills that will be needed in future career work. All students met the benchmark established for success. Several of the objectives have not been assessed yet, due to the courses not yet being offered. These objectives will be assessed and analyzed in coming years.

The faculty is working with Central Methodist University to develop a test for graduating seniors to better assess performance. This exam would be used in place of the Major Field Test that was used this year. Faculty at both institutions, along with faculty at other campus, have felt the MFT does not present a good representation of the knowledge expected of a typical undergraduate Mathematics student.

Analysis of the Assessment Process (Empirical & Non-Empirical) (HLC4B3)

The faculty will analyze and report on the assessment process in May after receiving results from the senior performance days and data from the student interviews.

Program Changes Based on Assessment:

The faculty has considered replacing MAT 324, Formal Logic, with an Advanced Calculus course for the program requirements. Many graduate Mathematics programs require an Advanced Calculus course in their requirements, and this would give our graduates an advantage. Many of the concepts of the Formal Logic course are also covered in the HUM 107 Critical Thinking course, which many majors take as a General Education requirement. The faculty will not propose this change for the 2015-16 school year, but may consider it in future years.

Improvement Narrative List

Assessment Findings for the Assessment Measure level
No improvement narratives have been added.

Program Activities

Student Performance Review
Describe the department assessment day activities if not already described previously. Please articulate the nature of the assessments are conducted, explain the process for assessment that happens on these two days. Include the schedule of assessment day for your program. What does the data and outcomes tell you? What changes will you make as a result of

the data? What areas are successful for the program?

Student Performance Day Activities (Assessment Day):

On February 21, the Mathematics department held the second annual induction ceremony of our Missouri Xi chapter of Kappa Mu Epsilon. KME is a national Matematics honor society with over 150 chapters nationwide. Our inductees were Mathematics majors, Briley Browning, James Rogers, and Bailey Ward; two non-majors who have taken a variety of Math courses: Alexis Bailey and Kelsey Scherder; and Mathematics faculty member Raymond Hune. Attendance was required for all Mathematics majors. Afterwards, a reception was held.

On February 22, the department held individual interviews with each of the majors. Along with the three majors mentioned above, we also spoke with Rhett Gauch and Mikayla Maple Laburay. We also spoke with two Physics majors, Katie Athanson and Glen DesBouillons. Mathematics faculty Chris Schneider and Raymond Hune and Physics faculty Vern Hart conducted the interviews. We were assisted by outside assessors Dennis Nickelson, a retired WWU faculty member, and Gerald Robinett, of the Missouri Department of Revenue. Each student was scored on the rubric, attached to this report, and received an individual report of their progress later in the semester.

Student Performance Review Schedule
Upload the program schedule for students during Performance Reviews.

Senior Showcase
Describe program Senior Showcase activities if not detailed previously in the report? What benefit does the program gain from the activities? What if any assessment of students happens during this event? What changes if any will occur due to what is learned by faculty on Senior Showcase?

No seniors will be graduating in Mathematics in the 2016-17 school year, so no Senior Showcase activities will be presented.

Assessment Rubrics
Upload rubrics used for Senior Showcase or Student Performance Reviews for student assessment.
Mathematics_Assessment_Rubric.doc

Service Learning
Does the Program include projects/ course content that uses the philosophy of service learning?
Yes
No (selected)

Service Learning Component
If so, how is service learning infused in the coursework within your department? Is service or community engagement in the program mission? Describe the Service Learning Activities that your students and department engaged in this past year. How did the activities improve student learning? How did the activities benefit the community?

There have been no Service Learning Activities for Mathematics.

LEAD Events
Highlight lead events sponsored by program faculty that are connected to program or general education objectives for the past academic year. Include a total number of lead events program faculty sponsored.

Student Accomplishments
Highlight special examples of student successes in the field (academic: mentor-mentee, conference presentations,

competitive internship, journal acceptance; extra-curricular: horse show championship, art exhibit). This is for any accomplishments that a student achieved outside of course work or the normal expectations of student success.

Annual Assessment Rubric

Total Score: 8/12 (66.67%)

	3.000 Assessment Reflects Best Practices	2.000 Assessment Meets the Expectations of the University	1.000 Assessment Needs Development	0.000 Assessment is Inadequate	N/A
Learning Objectives weight: 1.000	• Detailed, measurable program learning objectives • Objectives are shared with students and faculty	✓ • Measurable program learning objectives. • Learning objectives are available to students.	• Program learning objectives are identified and are generally measurable	• Program learning objectives are not clear or measurable	N/A
Comment:					
Assessment Measures weight: 1.000	• Multiple measures are used to assess a student-learning objectives. • Rubrics or guides are used for the measures. • All measurements are clearly described. • External evaluation of student learning included.	✓ • Assessment measures relate to program learning objectives. • Various measures are used to assess student learning. • Measures chosen provide useful information about student learning.	• Assessment focuses on class content only. • Minimal description of how the assessment relates to the objective. • Minimal assessment measures established.	• Assessment measures not connected to objectives. • Assessment measures are not clear. • No assessment measures are established.	N/A
Comment:					
Assessment Results weight: 1.000	• All objectives are assessed annually, or a rotation schedule is provided. • Data are collected and analyzed to show learning over time. • Standards for performance and gaps in student learning are clearly identified.	✓ • Most objectives assessed annually. • Data collected and analyzed showing an annual snapshot of student learning. • Data are used to highlight gaps in student learning. • Some data from non-course based content.	• Data collected for at least one program objective. • Data collection is incomplete. • Gaps in student learning not identified. • Lacking external data to support course data.	• Learning objectives are not routinely assessed. • Routine data is not collected. • No discussion on gaps in student learning. • No use of external data to support student learning. • Assessment data not yet collected.	N/A
Comment:					
Faculty Analysis and Conclusions weight: 1.000	• Data is shared that incorporates multiple faculty from the program. • Discussions on data results incorporate multiple faculty. • Opportunities for adjunct faculty to participate. • Includes input from external sources when possible.	✓ • Multiple program faculty receive assessment results. • Assessment results are discussed • Specific conclusions about student learning are made based on the available assessment results.	• Minimal faculty input about results is sought • Data not used to determine success or not to the objective. • Minimal conclusions made.	• Faculty input is not sought. • Conclusions about student learning are not identified. • N/A Program recently started or too few graduates to suggest any changes.	N/A
Comment:					
Actions to Improve Learning and Assessment weight: 1.000	• All assessment methods, timetable for assessing, and evaluating the effectiveness modifications are included. • Changes to assessment are inclusive of multiple faculty. • Description of changes is detailed and and linked to assessment results.	• More than one change to assessment is proposed, timetable for assessment, and evaluating the change is provided. • Changes to assessment measures is highlighted. • Changes are realistic, with a good probability of improving learning or assessment.	• At least one change to improve learning or assessment is identified. • The proposed action(s) relates to faculty conclusions about areas for improvement. • Adjustments to the assessment are proposed but not clearly connected to data	• Lacking actions to improve student learning. • Actions discussed lack supportive data. • Lacking discussion of the effectiveness of the assessment plan	✓ N/A
Comment:	There was assessment, but no discussion on any changes to the process or the curriculum. With such a small sample size it is hard to make general statements as to student learning from only one or two rounds of assessment.				