Mathematics Annual Assessment 2020-2021

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Annual Assessment 2020-2021

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 applications. 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 2019-2020	Student Minors 2019-20
3	5

Student Majors 2020-2021	Student Minors 2020-2021
2	6

Concentrations 2019-2020
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

There are no concentrations in the Mathematics program.

Concentrations 2020-2021
If your program contains concentrations, please list the concentrations and the number of students identified with each concentration.

There are no concentrations in the Mathematics program.

Student Demographics
What are the program goals for student retention, persistence and degree completion? 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?

The Mathematics faculty is planning to propose a Math Secondary Education degree to replace the dropped Mathematics major. We feel there will be Education students who wish to teach Mathematics in high school, and current middle school students (who basically complete a Math minor) might consider getting this additional certification.

The Mathematics faculty would like to increase the enrollment in the program. Although the individual attention and small classes' sizes are positives, it would be helpful to have more students to support the growth of the program. Some of the classes in the past have been tutorials, and the faculty would like to lessen the chances of that being necessary. The small sample size of students makes discussion of the persistence numbers challenging. Most of the students who entered the program have completed it.

Optimal Enrollment
Considering current human and physical resources, what is the optimal enrollment for the program?
10

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.

Marketing Materials
Please reflect on the current marketing materials used for the program. Detail what documents you are reviewing and attach a screenshot of any webpages or materials that you cannot include as a document. What changes, if any should be made to the material? Are there recommendations for how or where to market the program?

There are no materials currently specific to the Mathematics program, the minor is mentioned in the general Science and Health literature. A separate brochure should be prepared for the Mathematics Secondary Education major program when it is developed.

Marketing Material

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.

Alignment to the University Objectives

Please discuss the program alignment to the University Objectives. We do not need an artifact for each objective, but a discussion on how the program uses the Institutional Objectives as an anchor for their program curriculum.

Major Field Competence: Students who major in Mathematics at William Woods receive exposure to a variety of Mathematical concepts, both applied and theoretical, that will allow them to continue their discovery of Math either in graduate school, or in a career such as actuarial science.

Ethics: Statistics are encountered every day by all citizens. However, just because data is presented and a conclusion drawn from the information, it does not mean that it is good data or a good conclusion. Taking Mathematics courses (Statistics along with other courses) allow individuals to interpret the information and make their own conclusions as to the validity of the data/conclusions.

Self-Liberation: Many people have what is commonly referred to as "Math anxiety". They may have been afflicted with this at an early age, or they may have acquired it through their primary school years. The instructors in the Mathematics courses try to remove this anxiety from the students and show them that anyone can do Mathematics if they apply themselves. The realization that they can do the problems does give students an appreciation of themselves, and allows them the ability to interpret all the numbers in our daily lives.

Lifelong education: It is the hope of the Mathematics faculty that students (the majors in particular, but hopefully all students) do take what they have learned in their classes and have a curiosity in the future and recall some of the things they learned.

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

NSSE Objectives Discussed Fall 2019

Program Alignment to NSSE Objectives
How did your program integrate the three NSSE objectives determined by the faculty this fall. The objectives were to 1) integrate more interdisciplinary work within the curriculum, 2) to connect learning to societal problems or issues, and 3) to examine the strengths and weaknesses of their (students) own views on a topic or issue. Please articulate which courses, and what assignments were assigned and how the work was assessed. Were the assignments successful? What could have made them more successful?

1- Mathematics has always had a strong connection to the other sciences, particularly Biology and Physics. In the Biostatistics course, more examples were included that incorporated situations Biology students might see in their actual careers. There were no specific assignments added that addressed this topic.

2- Statistics are often used to support positions on social problems. Unfortunately, these statistics can also be misused to give credence to a certain narrative. It is important that students are able to interpret the data and reach their own conclusions independently.

3- With the knowledge gained in the Math and Statistics courses, hopefully students are able to understand their views in a more educated manner.

Curriculum Map

A - Assessed
R - Reinforced
I - Introduced
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	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	R	M	R						
MAT.3 Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.			R	R	R	R	R	M	M	M	M	A
MAT.4 Analyze situations involving multiple objects and constraints using multidimensional space.				I, M		R	R					
MAT.5 Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.	I	R, I		I	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

Changes to Curriculum
Are there any changes made to the curriculum map for this academic year? If so, please describe the program changes made along with the rationale for why and the impact the change should have on student learning?

We have not made any changes to the curriculum map for the 2020-21 academic year. There will be some changes with the Mathematics Education degree if it is offered, along with some new courses.

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.

Assessment Measures

Student Performance Review				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Portfolio Review	Has the criterion 80% of the students receive a score of 3 or higher on a 4 point scale for portfolio presentation? Been met yet? Met	1/1 (100%) of the majors met the criteria.		

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

Assessment Measures

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	1/1 (100%) of majors met the criteria.		

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

Assessment Measures

MAT 313				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Final Exam	Has the criterion 80 percent of students achieve 80 percent or higher on the final exam? Been met yet? Not met	2/3 (66.7%) of students achieved 80 percent or higher on the final exam. With the small sample size, this outcome was impossible to achieve unless all of the students met it. None of the students in the course were current majors.		- Refine Assessment Tool: The outcome will be reconsidered the next time the course is taught.

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	1/1 (100%) of majors met the criteria.		

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

Assessment Measures

MAT 423				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion 80 percent of majors score 80% or above on homework in the course. Been met yet? Not met	MAT 423 not offered in the 2020-21 academic year.		- : MAT 423 will be offered in the 2021-22 year.

MAT.7 Accurately use algorithms in appropriate contexts.

Assessment Measures

MAT 325				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion 80 percent of students achieve 80% or higher on class project assignment. Been met yet?			

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

Assessment Measures

MAT 314				
Assessment Measure	**Criterion**	**Summary**	**Attachments of the Assessments**	**Improvement Narratives**
Direct - Class Assignment	Has the criterion 80 percent of majors achieve 75% or higher on the class project assignment. Been met yet? Not met	MAT 314 not offered in the 2020-21 academic year.		- : MAT 314 will be offered in the 2021-22 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? Met	1/1 (100%) of majors met the criteria.		

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.

The Mathematics Department did not make any changes to the assessment process. We again administered the Major Field Test to all majors. We have not incorporated the results into the assessment rubric yet as we do not yet have enough scores to generate a baseline for assessment. We continue to use the interview/portfolio process on the Performance days and some classroom activities for assessment. We will review the process again in the coming year.

Improvement Narrative List

Assessment Findings for the Assessment Measure level

Standard/Outcome	MAT.5 Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.
Legend	A
Course/Event	MAT 313
Assessment Measure	Direct - Final Exam
Assessment Findings	Not met
Improvement Narrative	**Improvement Type**: Refine Assessment Tool **Summary**: The outcome will be reconsidered the next time the course is taught.

Standard/Outcome	MAT.8 Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.
Legend	A
Course/Event	MAT 314
Assessment Measure	Direct - Class Assignment
Assessment Findings	Not met
Improvement Narrative	**Improvement Type**: **Summary**: MAT 314 will be offered in the 2021-22 year.

<table>
<tr><td>Standard/Outcome</td><td>MAT.6 Exhibit competence in various methods of analytic proof.</td></tr>
<tr><td>Legend</td><td>A</td></tr>
<tr><td>Course/Event</td><td>MAT 423</td></tr>
<tr><td>Assessment Measure</td><td>Direct - Class Assignment</td></tr>
<tr><td>Assessment Findings</td><td>Not met</td></tr>
<tr><td>Improvement Narrative</td><td><table><tr><th>Improvement Type</th><th>Summary</th></tr><tr><td></td><td>MAT 423 will be offered in the 2021-22 year.</td></tr></table></td></tr>
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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?

We administered the major field test this year to our remaining major. This is the third year we have administered the MFT.

We conducted the interviews with our remaining Math and Pre-Engineering students virtually, following the same format as we have used in past years. Only the Mathematics faculty participated in the interview process this year.

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

2021_student_performance_days_Mathematics.pdf

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?

We did not have any graduating seniors this year, so we did not have any Senior Showcase activities.

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

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 is no Service Learning component in 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.

We did not have any LEAD events related to Mathematics this year, primarily due to COVID concerns.

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.

Opportunities for student accomplishments were limited this year due to COVID concerns.

Alumni Accomplishments
Please highlight special examples of any successes of recent graduated alumni (acceptance or graduation graduate school, employment or professional milestones. Include recent graduates.

Recent graduate Aurora Henriksen is pursuing graduate study in Mathematics at a university in her native Norway. Mikayla Maple Laburay and Bailey Ward are both employed with Veterans United Home Loans. Briley Browning taught eight grade Mathematics at Troy, Missouri. James Rogers is attending graduate studies in the United Kingdom. We do not have any information on Mackenzie Hawkins, who graduated last year.

Faculty Accomplishments
Highlight special examples of faculty success in the profession/field/content area. This is for any accomplishment of a faculty activity/research/professional nature.
Professor Schneider completed a review of a Number Theory textbook, in preparation for a new edition of the textbook.

Assessment Rubric

	3.000 Exceeds	2.000 Meets	1.000 Falls Below Expectations	N/A
Mission Statement Clearly Articulated weight: 1.000	The mission statement for the program is insightful and forward thinking. It aligns with the University Mission and learning objectives showing a clear alignment between the University and the program.	✓ The mission statement for the program clearly articulated and aligned with the University mission.	The mission statement is minimal at best.	N/A
Comment:				
Reflection on Retention weight: 1.000	The program provides a detailed description on the retention numbers. The program provides new ideas on how to improve retention of their program students or articulates what they are currently doing to keep students in their program.	✓ The program provides a basic reflection on the retention data provided.	The program does not reflect on retention data in a detailed way.	N/A
Comment:				
Defines External Accreditation Standards weight: 1.000	The program provides a detailed explanation of the accreditation organizations within the field along with all the timeline and supplemental information required for accreditation.	✓ The program provides a basic explanation of the accreditation organizations in the field.	The program fails to provide any accreditation information.	N/A
Comment:				
General Education alignment clearly explained weight: 1.000	The program provides a detailed explanation of the General Education criterial and how the basic skills learned are expanded upon in the program. Details include but are not limited to: specific courses, or activities that stretch the knowledge of the specific areas.	✓ The program provides a basic explanation of the General Education curriculum and how the skills learned are expanded in program courses.	The program provides a minimal explanation of the General Education curriculum and how the skills learned are expanded in program courses.	N/A
Comment:				
Curriculum Map alignment weight: 1.000	The curriculum map is detailed and complete.	✓ The curriculum map is complete	The curriculum map is not complete	N/A
Comment:				
Assessment of Objectives weight: 1.000	Assessment of objectives are spread out across the curriculum with a variety of assessment measures and each program objective is assessed a minimum of twice a year.	✓ Each objective is assessed a minimum of 2 times a year or an assessment rotation is explained so that all objectives are assessed. The assessments are not concentrated in one class.	The assessment map is not complete or much of the assessment happens in only one course. Not all objectives are assessed annually, nor is a plan provided on assessment.	N/A
Comment:	There are gaps in the assessment map for th eporgram. There are parts of the Student Performance Review that are left blank? for Objective 6 and objective 7...Objectives 2 and 4 have no assessment noted in the assessment map. Other objectives have only 1 assessment piece connected to the map. The faculty need to review and update the content there.			
Data Driven Decision-making is explained weight: 1.000	Curricular and assessment changes are articulated and validated through data based decisions. Faculty discuss the data that lead to curricular decisions being made.	✓ Curricular and assessment decisions are made based on data provided in assessment, but detailed alignment is not provided as justification for the change.	Changes are proposed and brought forth with little explanation on the data included in the decision, if data was included in the decision.	N/A
Comment:				

Documentation provided on assessment findings weight: 1.000	The program uploads all rubric and support information to support the claims in the assessment findings along with detailed instructions on the assessment process and data analysis.	The program uploads all rubric and support information to support the claims in assessment findings.	✓ The program did not upload the data to support assessment claims in the assessment findings.	N/A
Comment:	After looking through the files, I did not see any uploaded data files.			
Analysis of Assessment is complete weight: 1.000	The program completed assessment findings for each component identified, and provided a comprehensive summary of each assessment measure identified in the report.	✓ The program completed the assessment findings for each component and provided a summary for each assessment measure.	The program did not provide a completed assessment findings for each component, nor did they complete the summary for each measure.	N/A
Comment:	all assessment was complete, except for MAT 325 for objective 7. I think this is due to rotation?? but not sure. if that is the case just need to note that in the report.			
Improvement narratives are selected with intentionality weight: 1.000	The program identified Improvement Narratives that appear to move the program forward and see the bigger picture than only the specific program curriculum options	✓ The program used the provided Improvement Narratives and selected options that made sense to the objectives and issues within the assessment.	The program did not use any improvement narratives, or the ones chosen are not aligned with assessment results.	N/A
Comment:				
Student Performance Review weight: 1.000	The program described and provided a detailed account of Student performance Review activities. Data evidence provided and detailed.	✓ The program provided the schedule and a brief description of Student Performance Review with data of the results.	The program did not provide complete explanation on Student Performance Review nor did they provide data results.	N/A
Comment:				
Senior Showcase weight: 1.000	The program had all senior students participate in Senior Showcase and provided a detailed explanation of their expectation and the presentations presented.	✓ The program described the Senior showcase activities and provided some evidence of what was presented.	Little to no content of Senior showcase was provided.	N/A
Comment:				
Co Curricular activities weight: 1.000	The program detailed the activities of LEAD and other co-curricular programing that was provided throughout the year. They provided numerous events for students.	The program provided a listing of LEAD events and activities provided.	✓ The program provided little to no description of the Co-curricular activities provided throughout the year.	N/A
Comment:				
Faculty, alumni, and Student accomplishments weight: 1.000	The program provided detail updates on successes on Students, Alumni and Faculty with added information explaining the kinds of success that were experienced.	✓ The program provided a listing of information on Students, Alumni, and faculty accomplishments.	The program provided little to no data on students, alumni, faculty accomplishments.	N/A
Comment:				