WILLIAM WOODS
UNIVERSITY

Mathematics Program Review 2020

Program Review 2019-2020

Mathematics

Program Profile

History
Start with the history of the program at WWU. Discuss relevant trends and issues dealing with the program and the institution. If a program has one or more concentrations, each concentration should be discussed separately. (300 words or less)

The Mathematics Department at William Woods University has a twofold purpose—to provide the necessary courses and support to the Mathematics majors, and to provide the common studies courses for the rest of the campus community. For the majors, the goal is to prepare them for life after their undergraduate careers, either in the work force or in pursuit of graduate degrees at other institutions. For the rest of the campus community, the department provides students with a working knowledge of Mathematics to assist them in their everyday lives.

Since the General Education requirements include three hours of Mathematics courses for all majors, and six hours for some majors, virtually all students on campus have contact with the Mathematics program. The primary courses for General Education are MAT 112 Survey of College Mathematics, MAT 114 Elementary Statistics, and MAT 118 College Algebra.

The Mathematics Department also works closely with the Biology program. There are two Mathematics courses taken by Biology majors, Calculus I (MAT 124) and Biostatistics (MAT 304). The choice of course for each student depends on their areas of concentration and their future career plans.

A strength of the program is the individual attention allowed to each of the Math majors due to the small class sizes. The majors also take many courses together, allowing them to develop friendships and study groups as they proceed through their college years.

Program Mission
Provide the mission of the program and describe how the program supports the university mission. Discuss the philosophy or purpose of your program, how the program relates to the mission, vision and goals of the University.

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.

Student Demographics

Student DemographicTemplate
Insert the Data in to the provided template and reattach the data to the review.

	Incoming Freshmen	Transfer	Total
2018-2019	0	0	3
2017-2018	0	0	5

2016-2017	1	0	5
2015-2016	0	1	4
2014-2015	0	0	5

Concentrations
Create a chart that provides the student enrollment in program concentrations. Make a column for each year and a row for each concentration for the identified academic years.

There are no concentrations for the Mathematics major.

Program Demographic Data
Upload the program page from the Institutional Research office program data for this program.

William Woods University
Assessment Data

Program: Mathematics

		10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19
Declared Major	Incoming Freshm	0	2	3	0	0	0	1	0	0
	Transfers	0	0	1	1	0	1	0	0	0
	Total	5	4	6	7	5	4	5	5	3
	Undergraduate E	1,179	1,079	1,009	1,006	1,006	1,001	973	956	934
Declared Minors		1	2	3	4	3	4	3	3	5
Graduated Majors		1	0	1	1	2	3	0	2	
Graduated Minors		0	0	0	0	0	1	1	2	

Retention Rate: IPEDS definition[1]

	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
University	66.8%	76.2%	70.5%	76.3%	74.5%	74.5%	77.00%	74.0%
Program	0/0	2/2	2/2	0/0	0/0		66.7%	0

Graduation Rate: IPEDS definition[2]

	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
University	52.4	50.2	50.5	56.3	52.4	51.2	54.5	59%	57.50%
Program	1/1	1/2	1/2	1/1	1/3	0/1	NA		100%

Graduation Rate: Transfer Students[3]

	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
University	71.2%	68.8%	63.2%	66.7%	67.4%	69.9%	68.4%		54.10%
Program	0/0	2/2	0/0	1/1	0/0	NA	NA		50%

[1] = % of full-time, first-time students that return to the institution in the subsequent fall semester

[2] = % of the full-time, first-time cohort that graduate within 6 years

[3] = % of transfer students new to the institution in the fall semester that graduate with a bachelors level degree

Reflection on Program Enrollment Data
Clearly describe the approach of the program maintain or improve student retention and graduation rates. Does the

program have an active plan on retention of current students? if so, specificy the details of the plan.

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 have entered the program have completed it.   The faculty feels optimal enrollment for the program would be between 10-15 students,

Additional Program Resources
If your program has any additional syllabi, handbooks, policies that would be beneficial to an external reviewer and the academic council, please upload here.

NA

Advising
Please describe the advising load, including the average number of advisees for each faculty member within the program. What strategies do program faculty use to achieve successful degree completion and graduation success? How is advising managed by the program faculty?

The Mathematics majors have always been advised by Professor Chris Schneider, who is the primary instructor for the Mathematics major courses. He has averaged about ten advisees in the past three years. Professor Hune has not had any advisees, and Professor Davenport has averaged about ten advisees as well in her time here.

Internship & Placement
Student Internship Demographics
Use the attached chart or fill in your own data on the students completing an internship during the 5-year timeframe.

Senior Karyna Sagalai, who completed a Mathematics minor this year, also completed an internship with Veterans United Home Loans in the spring. She used this internship to complete some of the requirements of her Mathematics minor.

Program_Review_Internship_Chart.docx

Internship Placements
What placements outside of the university are used for internship/practicum/student teaching/clinical experience?

We have not had many internships with the Mathematics students in recent years. Veteran's United has been a resource, as there are two graduates currently employed there. We have encouraged students interested in actuarial science to pursue an internship with an insurance company.

Student teaching for those interested in an elementary/secondary school career is handled through the Education department, and is done in conjunction with public schools in the area.

Graduate Placement Data

Employment in Field
What types of positions are considered relevant to the "Field" of study with this program? Please define what it means for students to be employed 'within the field' of the professional discipline

Being employed in the field of Mathematics would involve positions involving the teaching of Mathematics, or a career as a actuary, a statistician, a data analyst, or a mathematician.

Graduate Placement Data
Please upload your data in the chart provided, either as an attachment or in the text box as a screenshot.

2020--Graduate Mackenzie Hawkins was unsure of her future plans as the semester ended, the ongoing pandemic was a concern in looking for employment.

2019-- Graduate Briley Browning is currently working as a real estate agent in the Troy, Missouri area while also considering graduate studies in Mathematics or pursuing a middle school teaching position.

  Graduate Mikayla Laburay is currently working at Veterans United Home Loans in Columbia, Missouri

2018-- Graduate Bailey Ward is also working at Veterans United Home Loans in Columbia, Missouri.

  Graduate James Rogers returned to his native England to pursue graduate study.

Program Curriculum

Curriculum: Rotation
Review enrollment trends by course. Are there particular courses that are not meeting enrollment goals?

Over the past five years, the enrollments of the major classes have remained stable, usually in the 3-9 student range. Some of the classes have needed to run as tutorials. As the number of math majors has remained relatively the same over this time, the enrollment is just an affect of which students need the classes at the times they are being offered. We have had some instances of students from Westminster coming to take our classes, particularly Higher Geometry, and in the last year cadets from the Missouri Military Academy have come to take Calculus I and DIfferential Equations. The program for the MMA cadets could be expanded to some of our other upper-level Math courses.

Curriculum: Delivery Mode
Does online enrollment impact campus enrollment? Is there a notable difference in enrolment between online and campus classes, where one is regularly more full than the other?

The courses in the Mathematics major are not offered online (other than the circumstances of the Spring 2020 semester due to the Covid-19 pandemic). Several of the developmental/general education classes are offered both on-campus and online, but the availability of the online class does not seem to affect the on-ground enrollment. The online classes being accelerated, running only half the time of the campus classes, is a major factor in this.

Curriculum: Revision
Explain any curricular revisions made since the Ist Program Review. What prompted the changes to curriculum? Were the changes prompted by student learning and assessment data or personnel changes? Did the curriculum changes produce the desired outcomes?

There have not been any revisions to the curriculum in the Mathematics major in the past year.

Curriculum: Shared Curriculum
List program courses that are required by other academic programs or that are cross-listed with other academic programs. How do these courses impact the program (ie: increased class size/need for faculty overloads to teach additional sections, ect? How often is the shared course offered? Has the rotation changed for shared classes?

There are no courses in the Mathematics major that are cross-listed with any other programs.

Curriculum Enrollment
Attach the Curriculum enrollment for all program courses.

Course	Title	2014-2015 Fall	Spring	2015 Summer	2015-2016 Fall	Spring	2016 Summer	2016-2017 Fall	Spring	2017 Summer	2017-2018 Fall	Spring	2018-2019 Fall	Spring	2019 Summer
MAT124	Calculus I	18/25	NA	NA	15/25	NA	NA	19/25	NA	N/A	17/25	N/A	12/25	4/25	N/A
MAT214	Calculus II	NA	NA	NA	NA	6/30	NA	1/30	NA	N/A	N/A	N/A	N/A	N/A	N/A
MAT215	Linear Algebra	NA	NA	NA	4/25	NA	NA	NA	NA	N/A	5/25	N/A	N/A	N/A	N/A
MAT224	Calculus III	NA	3/25	NA	NA	NA	NA	NA	5/25	N/A	N/A	N/A	N/A	4/25	N/A
MAT312	Differential equations	NA	NA	NA	NA	6/30	NA	NA	NA	N/A	N/A	9/30	N/A	N/A	N/A
MAT313	Math Probability & Stats	NA	5/25	NA	NA	NA	NA	NA	5/25	N/A	N/A	N/A	N/A	6/25	N/A
MAT314	Higher Geometry	2/2	NA	NA	NA	5/25	NA	NA	1/1	N/A	N/A	N/A	10/30	N/A	N/A
MAT324	Formal Logic	NA	NA	NA	7/25	NA	NA	NA	NA	N/A	2/25	N/A	n/A	N/A	N/A
MAT325	Intro Numerical Analysis	7/25	NA	NA	NA	NA	NA	6/25	NA	N/A	N/A	N/A	5/25	N/A	N/A
MAT422	Modern Algebra	NA	NA	NA	NA	1/25	NA	NA	NA	N/A	N/A	9/25	N/A	N/A	N/A
MAT423	Theory of Numbers	NA	NA	NA	2/30	1/1	NA	NA	NA	N/A	4/30	N/A	N/A	N/A	N/A

Program Checklist
Attach the Program checklist from the most recent Academic Catalog

B.A. MATHEMATICS – 37 credits   **2014-2015 Catalog**

ID#:_____

Name:_____   **Advisor:_____**

Students are required to have 122 distinct credits for graduation

Bachelor of Arts degree programs require a minor and a year of a foreign language.

Minor:_____ Foreign Language:_____

REQUIRED COURSES 37 credits

Course	Credit	Semester Completed	Grade Earned	Substitutions
MAT124 Calculus I	5			
MAT214 Calculus II	4			
MAT215 Linear Algebra	3			
MAT224 Calculus III	4			
MAT312 Differential Equations	3			
MAT313 Math Probability & Statistics	3			
MAT314 Higher Geometry	3			
MAT324 Formal Logic	3			
MAT325 Intro Numerical Analysis	3			
MAT422 Modern Algebra	3			
MAT423 Theory of Numbers	3			

Student:_____Date:_____

Advisor:_____Date:_____

Division Chair:_____Date:_____
Substitutions to the coursework above requires the signature of the division chair.

Mathematics (MAT) B.A.	37 credit hours	2018 – 2019 Checklist
student name:		**student ID:**
advisor:		

☐ **Students are required to have 122 distinct credits for graduation**
☐ **42 credits of said 122, must be from upper level courses** (*i.e.* 300/400-level)
☐ **All students must complete the 43 credits of General Education for graduation**

Bachelor of Arts degree programs require a minor and a year of a foreign language.

minor:

foreign language:

Required Core Courses 37.00 credits

Course	Course Title	37.00	Semester Completed	Grade Earned	Substitutions
MAT 124	Calculus I – M	5.00			
MAT 214	Calculus II	4.00			
MAT 215	Linear Algebra	3.00			
MAT 224	Calculus III	4.00			
MAT 312	Differential Equations	3.00			
MAT 313	Math Probability and Statistics	3.00			
MAT 314	Higher Geometry	3.00			
MAT 324	Formal Logic	3.00			
MAT 325	Introduction to Numerical Analysis	3.00			
MAT 422	Modern Algebra	3.00			
MAT 423	Theory of Numbers	3.00			

substitutions must be approved by the Division Chair

Course Description

Upload program course descriptions from the most current Academic Catalog.

Mathematics B.A. – Course Descriptions

All Bachelor of Arts degree programs require a minor and a year of a foreign language.

Required Courses:

MAT 124 – Calculus I

An introduction to the concepts of limits, continuity, differentiation of elementary functions, definite and indefinite integrals, and the Fundamental Theorem. Emphasis on use of graphing calculators and the utility of mathematics as a problem-solving tool. Extensive discussion of applications in natural science, social science, and business. Has a prerequisite of MAT118 or MAT120 or MAT125 or higher.

MAT214 – Calculus II

A continuation of MAT 124. Further techniques of differentiation and integration, the calculus of exponential, logarithmic, trigonometric, and probability distribution functions, as well as elementary differential equations. Requires extensive use of graphing calculators. Applications to biology, economics, and physics are studied throughout. Prerequisite: MAT 124.

MAT 215 – Linear Algebra

A study of the techniques used in solving linear systems of equations, the properties and theorems associated with vector spaces, determinants and eigenvalues, and linear transformations. Has a prerequisite of MAT124.

MAT 224 – Calculus III

A continuation of MAT 214, including solid analytic geometry, vector spaces, matrices, determinants, partial differentiation, multiple integration, and vector calculus.   Has a prerequisite of MAT214.

MAT 312 – Differential Equations

A study of ordinary differential equations and the following topics: boundary-value problems, Fourier series, and the Laplace transform. Has a prerequisite of MAT124.

MAT 313 – Mathematical Probability and Statistics

A calculus-based introduction to the mathematics of probability and statistics. A study of discrete and continuous probability distributions and their application to areas of statistical inference, including estimation and hypothesis testing. Has a prerequisite of MAT124.

MAT 314 – Higher Geometry

A study of Euclidean and projective geometries as axiomatic systems, from both the synthetic and analytic approach, and an introduction to non-Euclidean systems. Has a prerequisite of MAT124.

MAT 324 – Formal Logic

An introduction to elementary deductive logic to include propositional logic and first- order quantification theory with identity. Emphasis on natural deduction techniques. Some discussion of computability and other topics in the foundations of mathematics and philosophy of logic. Has a prerequisite of MAT118.

MAT 325 – Introduction to Numerical Analysis

This is the first course in numerical analysis covering fundamental concepts, theoretical foundations of numerical methods, error analysis and practical computer implementations using Software. An integral part of this course is a series of computational projects designed to illustrate and emphasize the course material. Has a prerequisite of MAT124.

MAT 422 – Modern Algebra

A study of the properties and theorems associated with groups, rings, integral domains, and fields. Has a prerequisite of MAT224.
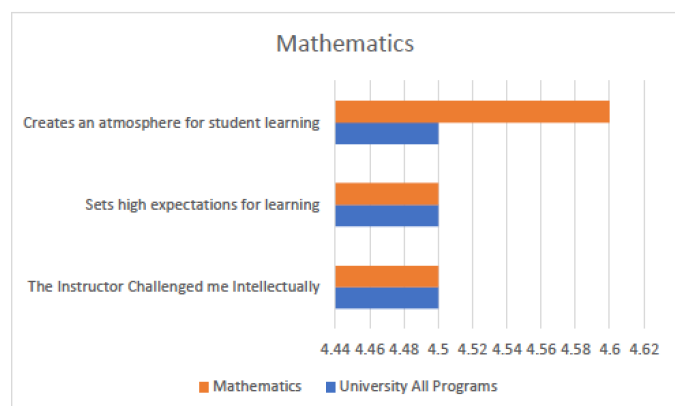
MAT 423 – Theory of Numbers

A study of divisibility, congruences, quadratic reciprocity, number theory functions, Diophantine equations, simple continued fractions and algebraic numbers. Has a prerequisite of MAT224.

Summary of Teaching Effectiveness
This data is compiled by the Office of Institutional Research and is comprised of End of Course evaluation responses of students. The data is comprised of the responses from Q8 "creates an atmosphere for student learning", Q16 "sets high expectations for learning, and Q22 "instructor challenges me intellectually".

Mathematics: Summary of Teaching Effectiveness

Course Evaluation Summary:

SAMPLE:
N=381   55% Response Rate

This data is representative of courses listed on the program checklist. Any online courses are not included as the data does not yet align on the end of course evaluations. This data represents end of course surveys from the 2017-2018 and 2018-2019 academic years.

Faculty Response to Teaching Effectiveness
How does this information impact faculty perceptions of classroom management and academic rigor? Will any changes be made resulting from this data? Are there other data available from Student Performance Review or alternative measures pertaining to academic success that can be used to discuss teaching effectiveness?

The data shows that the Mathematics courses promote an atmosphere for student learning that is considered average to above average in the William Woods community. In particular, the survey shows high marks for providing a positive atmosphere for student learning. Although Mathematics classes are not always ones students are excited about taking, our faculty supports them and provides them assistance if they have any struggles.

Faculty & Resources
Physical Facilities

Physical Space/Resources
Describe the physical facilities that are unique to your program, including specialized buildings, classroom space, labs, and built in equipment and how they impact student learning. (If none, put N/A)

The majority of the Mathematics courses taught by the faculty are held in the Cox Science and Languages building. Primarily the classrooms on the third floor are utilized.

S/L 300 is the largest room, able to hold about 40 students in very crowded conditions, and is also set up with a computer and Sympodium technology and a large wall mounted projection screen with a permanently mounted LED computer projector. The room has large tables for the students. This room is mainly used for the Biology courses but has been utilized by Mathematics courses when available.

S/L 301 is another large classroom. The room has tables and can seat about 25 students comfortably. The room is fitted with an LED overhead projector and an HP computer hooked up to this projector. In the past, faculty purchased their own projectors to use in the rooms, an inconvenience that is no longer necessary. The room is convenient with large tables that can be moved easily to facilitate classroom discussion. It also contains ample blackboard space. A mobile whiteboard was also purchased that is primarily used in this room, but can be easily moved to other classrooms.

S/L 313 is a classroom primarily used by Professor Raymond Hune for the Developmental Math courses (098 and 099). This will also be the location for the Math Center which offers additional tutoring options for students. The room has an LED overhead projector with computer attached, and also several other computers for student use. This room was also upgraded with a whiteboard. The room has large tables and can accommodate about 15 students.

S/L 312 is a large classroom with about 25 chairs with a mixture of tables and separate student desks. The room also contains ample board space. This room also is equipped with an LED overhead projector and HP computer.   Professor Schneider is the primary user of this classroom, with almost all of his courses held there.

The faculty offices are also housed in the S/L building, along with a computer lab on the second floor, S/L 200. The lab contains several workstation computers with internet capability and a photocopier. A copier/printer is provided separately in the S/L building for faculty use. This lab is also utilized by the Numerical Analysis course (MAT 325) for access to Microsoft Excel. The Biological Statistics (MAT 304) course also used this room for access to technology.

Classes for the lower level Mathematics courses are also held in the S/L building basement in room 101, but have also been taught in other locations on campus, including the Academic Building, the Burton Building, and the Center for Human Performance.

Upgrades to Physical Space/Resources
Changes/Upgrades that have been completed within the past 5 years, specifically for your program or are required because of your program along with any impacts to student learning.

There have been no upgrades to the classrooms primarily used by the Mathematics department in the past five years,

Recommendations to Improve Resources
Describe any desired changes/upgrades to facilities/resources and how the proposed changes would impact student learning.

The Math faculty have recommended that all classrooms be upgraded to whiteboards. This will eliminate the issue of chalk dust, which is unhealthy and can cause issues with the computer equipment in the classrooms.

Technology Resources
List current technology specific for the program. What technology is used on a regular basis? Are there any technology needs for the program, issues with technology that impact the classroom? Is there technology that would benefit the teaching in the classroom that the program would like to investigate?
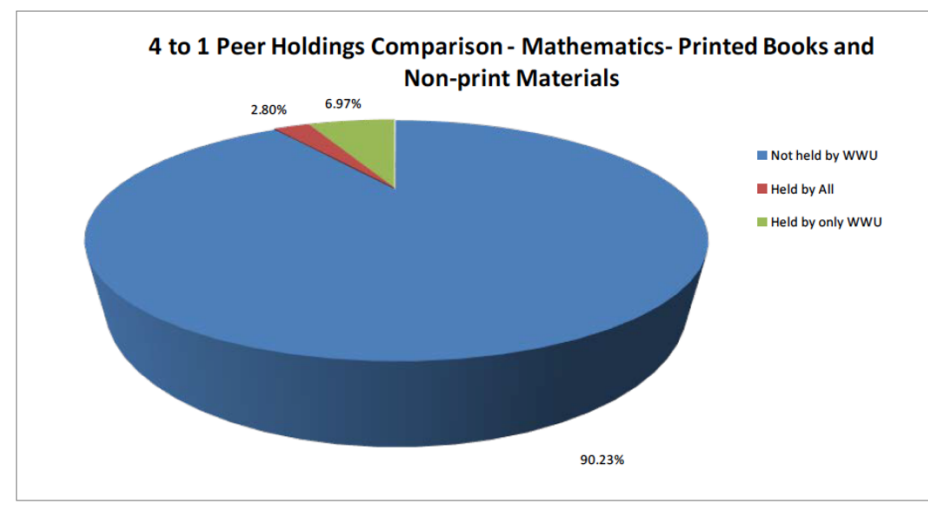The Mathematics faculty frequently make use of the Ti SmartView program, which allows the TI calculator to be projected onto an overhead screen allowing students to follow along as the instructors use the device. This program does not have any licensing fees so no cost is incurred.

Library Resources:
Insert the narrative from library staff pertaining to changes and recommendations to program specific library holdings.

III. Comparison with Peer Institutions (4 to 1 comparison)

Libraries Used for Comparison: Stephens College, Columbia College, Westminster College, Central Methodist University

4 to 1 Peer Holdings Comparison - Mathematics- Printed Books and Non-print Materials

- 2.80%
- 6.97%
- 90.23%

Legend:
- Not held by WWU
- Held by All
- Held by only WWU

IV. Analysis

Mathematics as a discipline taught at the undergraduate level requires primarily up-to-date materials. A continued effort is made to acquire materials in both electronic and printed formats. All books, journal articles and non-print materials are available through *Woods OneSearch.* The Library subscribes to a comprehensive database, *Academic Search Complete,* which is available to all students, both traditional and online.

The library staff acquires any resources that are not available in existing print and digital collections through interlibrary loan.

As in all other disciplines, WWU faculty and students have access to the resources available in MOBIUS member libraries, which includes the superb collections at the large research institutions in the state of Missouri, i.e., the four campuses of the University of Missouri, Washington University, Missouri State University and St. Louis University. Beginning in 2014, access to the resources of the academic, public and special libraries in Colorado and Wyoming became possible through Prospector, a resources sharing partner of MOBIUS. Prospector provides access to an additional 30 million books, journals, DVDs, CDs, videos and other materials, and includes the collections of the libraries at the campuses of the University of Colorado, Colorado State University, University of Denver, and the University of Wyoming. Resources selected from both MOBIUS and Prospector are delivered by courier, thereby reducing the delivery time.

Library Resources:
Faculty response to the adequacy of library resources provided to the program?

The Mathematics faculty feels the library resources available are adequete,

Library Report
Attach the complete library report that is provided from thedirecotr of the Library that details the available resources to students in the program of study.
Mathematics_2020.pdf

Faculty and Staff Resources

Faculty
1-list all full time faculty in the program with highest degree, degree granting institution, years of full time teaching experience WWU, and contractual course load. 2-List adjuncts who have taught within the last 3 years with the same qualifying information and which courses they have taught.

Chris Schneider, 15 years at William Woods, full time course load

Raymond Hune, 8 years at William Woods, full time course load

Julie Davenport, 3 years at William Woods, full time course load

Faculty Curriculum Vitae
Attach current Vitae for all full time Faculty
Julie_Davenport.pdf
Raymond_Hune.pdf
Chris_Schneider.pdf

Adjunct Faculty Curriculum Vitae
Attach current Vitae for all adjunct faculty in the program.
Elizabeth_Head.pdf

How many staff are designated to support the program?

1

Staff
Do you feel the program is adequately staffed in order to meet the goals of the program?
Yes (selected)
No

Staff
Are issues with staffing impacting student learning?
Yes
No (selected)

Faculty Percentage of Courses Taught by Full-time vs. Part-time
Please include a chart of the number of classes taught within the program that are taught by full time and part time faculty. Please include academic years Fall 2014 through Spring 2019

Term	Full time faculty	Part time faculty
Fall 2015	10	4
Spring 2016	10	4
Fall 2016	10	3
Spring 2017	7	2
Fall 2017	13	0
Spring 2018	12	0
Fall 2018	13	0
Spring 2019	13	0
Fall 2019	15	0
Spring 2020	13	0

Faculty Reflection on Teaching Load Distribution
Please discuss the distribution of courses between full time and part time faculty. What impact if any does this have on students and/or the curriculum?

Since the addition of a third Mathematics faculty member in 2017, all Mathematics courses on campus have been taught by full time faculty. This allows consistency in the courses as they are taught by the same instructors from semester to semester. It also allows stability in scheduling courses, as it is now unneccesary to find new adjuncts due to current adjuncts no longer being able to teach. This stability is likely a contributing factor in the positive course evaluation data the department has received in recent years.

Recommendation on Personnel
What recommendations to personnel (Faculty/Staff) do the program faculty recommend? What is the rationale for the recommendation?

There are no recommendations for changes in the personnel in the Mathematics program at this time.

Financial Analysis of the Program

Cost Per Major
This number is from the Academic Dean Report on Program Prioritization.
$51,494.00

Financial Analysis by Program
Discuss issues and implications of the program budget. – need more description here to allow for a review of the financial cost of the program. I would like to add a prompt for programs to also report on their program cost per credit hour provided, in many cases this will look totally different to the cost per major, but still provides an alternate route to view the financial cost of a program.

*the Cost Per Major is calculated based on the total expenses, divided by the total number of majors. This number does not include the service hours that are provided by program faculty.

While there are a small number of Mathematics majors, the Mathematics program serves the entire William Woods community with developmental and General Education courses. If the cost per credit hour is considered, the number drops to $ 1735.75 for the 2019-20 academic year. This number more accurately reflects the program's financial cost, as the Mathematics majors have been primarily the responsibility of only one of the three faculty over the last five years, with the remaining two faculty primarily handling developmental and General Education courses. These courses are necessary to provide a well-rounded education to all students at William Woods University.

Instructional Expenses
Discussion of expenses related to instruction. i.e. Internship, clinical, practicums…

There are no instructional expenses for the Mathematics program other than the cost of supplies such as chalk and dry erase markers. These are handled within the Mathematics budget.

Non-Instructional Expenses
Expenses that are included in the budget but not part of the instructional aspect of the program, not all programs have this.

The non-instructional expenses for the Mathematics program are minor, we have paid the initiation fee ($20.00) for our new Kappa Mu Epsilon honors society members. We also have paid for the Major Field tests that we have given to all majors the last two years. This expense has been covered through the Assessment budget.

Assessment Planning

University Objectives
Use the Attached copy of the University Student Learning Outcomes and discuss the alignment of your program to these objectives. How do the courses in your program support and contribute to expanding students' knowledge?

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 curiousity in the future and recall some of the things they learned.

Institutional_Learning_Outcomes.docx

Program Outcomes

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.

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.

Program Assessment Matrix
Please insert a chart that shows the matrix for your program assessment plan/report.

The Program Assessment matrix is provided in the Annual Assessment reports, available elsewhere in this report.

Assessment Matrix
If your program already has a working document for the program matrix, please upload it here. No need to reproduce it in the text box.

Assessment Data
Annual Assessment Report 2018-2019

Mathematics_Annual_Assessment_2018_2019_2.docx

Annual Assessment Report 2017-2018

Mathematics__Annual__Assessment_17_18.pdf

Annual Assessment Report 2016-2017

Mathematics_Annual_Assessment_16_17.pdf

Annual Assessment Report 2015-2016

Mathematics_Annual_Assessment_Report_final_2015_2016.docx

Annual Assessment Report 2014-2015

Mathematics_Annual_Assessment_Report_2014_2015.docx

Snapshot on Assessment (5-year)
Please refer back to the program Annual Assessment report and create a graph showing a 5-year trend on assessment data for your program objectives. This should show a quick view of how programs are meeting or not meeting set benchmarks from student assessment. Each objective should have its own graph in order to keep it organized and easy to track. Each graph should have a short narrative explaining what is happening with the data and what implications that has on the program and student learning.

Over the past five years, the Mathematics majors have generally met the benchmarks set by the faculty. One of the issues with the small enrollment numbers is that it is difficult to adjust a benchmark from something from 75% to 90% for example, as this would basically be the same as saying 100% must meet the benchmark.

Snapshot on Assessment
If the program already has a document with the charts created, then that document can be uploaded here for the purposes of this report.

Objective 1: Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
SPR	100%	100%	100%	80%	100%
	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+
SPR	N=3	N=5	N=5	N=5	N=5

Objective 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					
	2018-2019	2017-2018	2016-2015	2015-2016	2014-2015
Senior Project				100%	
				N=2	

Objective 3: Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
SPR	100%	100%	100%	80%	100%
	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+
SPR	N=3	N=5	N=5	N=5	N=5

Objective 4: analyze situations involving multiple objects and constraints using multidimensional space					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
MAT 224	100%	Not offered	80%	Not offered	100%
	80% will 80% on final		80% will 80% on final		80% will 80% on final
MAT 224	N=4		N=5		N=3

Objective 5: Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
MAT 313	Not offered	Not offered	100%	Not offered	100%
SPR	100%	100%	1000%		
	80% will 80% on final	80% will 80% on final	80% will 80% on final 80% will 75%+		80% will 80% on final
MAT 313			N=5		N=5
SPR	N=3	N=5	N=5		

Objective 6: Exhibit competence in various methods of analytic proof					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
MAT 423	Not Taught	100%	Not offered	100%	100%
SPR	100%	100%	100%		
	80% will 75%+	80% will 80% on final 80% will 75%+	80% will 75%+	80% will 80% on final	80% will 80% on final
MAT 423		N=4		N=3	N=1
SPR	N=3	N=5			

Objective 7: Accurately use algorithms in appropriate contexts					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
MAT 325	100%	Not offered	100%	not offered	100%
SPR	100%	100%	100%		

	80% will 80% on final 80% will 75%+	80% will 75%+	80% will 80% on final 80% will 75%+		80% will 80% on final
MAT 325	N=5		N=5		N=7
SPR	N=3	N=5	N=5		

Objective 8: Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends					
	2018-2019	2017-2018	2016-2017	2015-2016	2014-2015
MAT 314	80%	Not offered	Not offered	80%	0%
SPR	100%	100%	100%		
	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+	80% will 75%+
MAT 314	N=5			N=5	N=1
SPR	N=3	N=5	N=5		

Analysis on Assessment
What is the assessment process for the program overall? What general activities are used to collect assessment information? Are all faculty involved in the assessment process?

The Mathematics program uses several activities for assessment. Each year during the Student Performance Review days, each major completes a personal reflection statement where they review the classes and experiences they have had, and think about their plans and goals for the future. They then meet with the Mathematics faculty for a personal interview, where they discuss their reflections, along with answering questions from the faculty. They also are asked to prepare a presentation of a problem from one of their prior courses. The faculty use a rubric to assess each major's performance during this process.

In the past two years, we have also asked each major to take the Mathematics Major Field test. Due to small numbers of students taking the exam, we have not gathered enough data to make any conclusions about our student's performance compared to their peers.

The faculty have selected assignments and projects from several of the major courses to also be used as assessment vehicles. These assignments are generally ask the student to show skills in several of our objectives.

External Review

External Review is not a condition of the program review for minor programs… the program was modified to a stand-alone minor during the course of the program review.

It was determined that an External Reviewer would not be used due to the program being downsized to a Minor only program.

Conclusions and Recommendations

Program Identified Strengths
Discuss strengths of the program as they impact student learning.

The strengths of the Mathematics program are the small class sizes and the individual attention this allows faculty to provide to the students. We get to know the students and this is an advantage in advising them in their future career/educational plans. As they take many of their classes with their peers as they progress, they also become close to them, giving them further connections for advice.

Program Identified Challenges
Discuss any challenges of the program as they impact student learning. What is the program doing to combat these challenges?

Technology issues are a challenge for the department with a limited budget for purchasing software packages that are used in the Mathematical fields today. The faculty have been identifying free alternatives which provide much of the benefits of the commercial packages without the cost concerns.

Action Plan
What is the plan for the program moving forward. What anticipated changes will be implemented as a result of this report?

The Mathematics major was discontinued for the 2020-21 academic year. It will continue as a stand-alone minor going forward.   The faculty will use this time to reevaluate the course offerings and see if there are courses that would be beneficial to the William Woods student body as a whole, such as the presently offered Biological Statistics class for Biology majors and the previously offered Business Calculus for Business students.

As STEM is a growing field and careers fir the Mathematical sciences and Statistics remain in high demand and are among the higher salaried fields for new graduates, it would be the hope of the Mathematics faculty that the Mathematics major be considered in future years for reinstatement.

Academic Council Review

Accept Report as submitted, no further action
Accept Report with recommended changes
Revisions requested and resubmit the report
Program did not meet the minimum standards and is placed on an improvement plan.

Academic Council Evaluation for Program Review

3=Exemplary   2=Adequate   1=Needs Improvement   0= Not Evidenced

	Program Profile	
1.1	History of the program is succinct, but detailed. (-300 words)	2
Comments: nice history and connection of the program to the university as a whole		
1.2	Program's purpose/mission is clear, including relationship to the university's mission statement.	2
Comments: Like how the program continues to focus on an environment for student learning.		
1.3	Clearly describes the approach to maintain or improve student retention and graduation rates.	2
Comments:		
1.4	Program has clearly defined strategies for retention and graduation rates of students.	2
Comments:		
1.5	Program advising loads are appropriately delegated throughout the program	2
Comments:		
1.6	Program has clearly articulated advising processes followed by all faculty within the program.	2
Comments:		
1.7	Comprehensive accounting of graduates in internship placements	2
Comments:		
1.8	Provides detailed description of possible employment positions for graduated students.	2
Comments: Nice accounting of the graduates from the program and what they are currently doing.		
1.9	Post-graduation data is complete and provides a picture of where students go after graduation.	2
Comments:		

	Curriculum	
2.1	Course rotation is followed in the way courses are offered with minimal tutorial/independent study courses.	2
Comments: The rotation tries to avoid the need for tutorial courses		
2.2	Reflection on course offerings and enrollment of courses, rotation, and demand.	2
Comments: Faculty do a good job of keeping to the rotation of courses.		
2.3	Course offerings appear appropriate for the needs of the program.	2
Comments:		
2.4	Discussion on curriculum changes based on assessment are clearly explained and complete	2
Comments: Nice summary on how online courses run independent of the on-ground courses and that there is no impact to the on-ground course from the online offerings.		
2.5	Teaching effectiveness summary within the program is detailed and faculty respond to successes and deficiencies within the evaluation.	2
Comments: nice job		
2.6	Course descriptions are detailed and specific. They reflect the levels of rigor identified by Curriculum Committee in their descriptions. (100-400 level)	2
Comments:		
	Physical, Human, and Financial Resources	
3.1	Summarizes all physical equipment needs and supplies noting any deficiencies and the impact on student learning.	2
Comments:		
3.2	Summarizes the physical space available to the program	2
Comments:		
3.3	Summarizes the Technology equipment needs and supplies noting any deficiencies and the impact on student learning.	2
Comments: Good job at finding cost efficient solutions for the technology needs.		
3.4	Provides summary analysis of library holdings, noting specifically how deficiencies, if any, affect student learning	2

Comments:		
3.5	Faculty qualifications and specific competencies are fully and accurately described	2
Comments: Qualified faculty teaching the courses with minimal adjunct faculty in the program courses.		
3.6	Provides a sound rationale for current staffing and/or future recommendations related to student learning.	2
Comments:		
3.7	Provides rationale and recommendations to improve resources that would address such deficiencies and link student learning.	2
Comments:		
3.8	Provides sound rationale on the financial aspects of the program. Reflects on the cost per major and fiscal needs of the program.	2
Comments: The additional explanation of the cost per credit hour and how it changes the narrative of the program expense is critical to understanding the role the faculty have on campus.		
Assessment		
4.1	Includes University learning outcomes and assessment measures, which are clearly explained.	2
Comments:		
4.2	Includes Program learning outcomes and assessment, which are clearly explained.	2
Comments:		
4.3	Standards for performance and gaps in student learning are clearly identified with action plans for improvement if needed.	2
Comments: Added the benchmarks into the assessment which made the information more beneficial		
4.4	The student learning objectives are appropriate for the specific discipline.	2
Comments: The objectives cover a wide variety of skills, but do a good job of covering the needed content.		
4.5	Includes a longitudinal view of assessment for each program learning outcome	2
Comments: Appreciated the number of students included in the data provided. The N makes a difference when we are looking at the data on programs like this.		
4.6	Discussion on the assessment process over the 5 year span.	2

Comments: Clear and concise showing of the data.		
External Review		
5.1	Program response to all criteria marked as a 2 or lower on the External Review report is complete with specific strategies for improvement.	NA
Comments:		
5.2	Response to the external review is complete and detailed	NA
Comments:		
Conclusion		
6.1	Strengths of the program are discussed	2
Comments: Comments below		
6.2	Challenges of the program are discussed.	2
Comments: Comments Below		
6.3	Action plan for the program is visionary, showing evidence that the program is aiming for a higher level of student learning.	2
Comments: Comments Below		

Program Strengths

The program articulated clearly how faculty are able to make connections with students and help them find the support needed to be successful with the curriculum. The program has been successful at placing students post-graduation in professional careers highlighting their math degree. The program also has a nice span of skills listed with in the 8 identified objectives. The teaching effectiveness is reinforced by the evidence from the End Of Course survey data, where the program faculty outscored the university average on "creating an atmosphere for student learning". The skill of the faculty is also a strength. The consistency and focus of the faculty has been a strong support for the program and a steady force leading the program forward.

Program Weaknesses

A challenge of the program is clearly the size of the students registered for majors' courses. It is hard to work forward and create strong forward momentum when enrollment in the higher skilled classes is so small. Another challenge of the program is marketing the skills learned as professions oriented as a way to connect with students as to the value of the degree.

Recommendations

Look at different avenues in which the math program/faculty can explore mathematical concentration content. The math faculty have talked about Actuarial Science and that the kind of innovation that needs to be investigated. Another option would be to look at some curriculum in Data Analytics, or interdisciplinary avenues. Programs like business and Psychology would be interested in creating concentrations that included more mathematical content for analytical/research-based skills.

Appendix:

Mathematics Annual Assessment 2018-2019

Annual Assessment 18-19

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 2017-18

5

Student Majors 2018-19

3

Student Minors 2017-18

3

Student Minors 2018-19

5

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? What is the optimal enrollment for the program?

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 have entered the program have completed it.   The faculty feels optimal enrollment for the program would be between 10-15 students,

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?

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.

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
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	SPR
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 multidimensional space.				I, A, M		R	R					
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

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?

There were no changes to the curriculum for the 2018-19 year.

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

SPR				
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	100% of students received a score of 3 or higher on the Mathematics assessment rubric.		

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

Assessment Measures

SPR				
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	100% of students achieved a score of 3 or higher on portfolio presentation.		

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

Assessment Measures

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	4/4(100%) of students achieved 80 percent or higher on the Calculus III exam.		

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% of students will achieve a score of 80 percent or higher on the Mathematical Statistics final exam. been met yet?			

SPR				
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	100% of students achieved a 3 or higher score for portfolio presentation.		

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 - Final Exam	Has the criterion 80% of the students will achieve a B grade or higher on the final exam. been	MAT 423 was not taught in the 2018-19 school year.		

	met yet? Not met			

SPR				
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	100% of students achieved a 3 or higher score for portfolio presentation.		

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% of the students will achieve a B grade or higher on the class project. been met yet? Met	5 of 5 students (100%) achieved a B or higher grade on the class project.		

SPR				
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	100% of students achieved a 3 or higher score for portfolio presentation.		

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 - Case Study	Has the criterion 80% of the students will achieve a score of 75 or higher on this project. been met yet? Met	4 of 5 (80%) of William Woods students achieved a score of 75 or higher on the project.		

SPR				
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	100% of students achieved a 3 or higher score for portfolio presentation.		

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 made a few changes to the assessment process this year. We began administering the Major Field Test to all majors. We have not incorporated the results into the assessment rubric yet as we wanted to get a baseline for the scores. 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
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?

As mentioned earlier, the Math department made some changes to the assessment day process this year. On the first day of the Performance Days, all majors took the Mathematics Major Field Test. Afterwards, we had the induction ceremony for our honor society, Kappa Mu Epsilon, as we have done in past years.   On the second day, the Math faculty, along with Physics professor Sean Baldridge, met invidually with each Mathematics major (as well as the Physics and Pre-Engineering majors) for an individual interview. The students were asked to prepare a portfolio beforehand, indicating the progress so far in their degree program, along with their future academic/career goals.

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?

The two Mathematics seniors, Briley Browning and Mikayla Laburay, presented a discussion of Cryptology from their Number Theory course. All of the other Math majors attended the presentation, as well as several other William Woods students, it was an opportunity for LEAD credit for them. The Mathematics faculty assessed their presentation, although we have not developed a rubric for this as yet. We will consider this for the future.

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?

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.

As mentioned above, the Senior Showcase presentation was a LEAD event. About 16 students attended the presentation.

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.

Both of the seniors obtained employment in the field before they graduated. Mikayla Laburay is an Associate Financial Representative for Northwestern Mutual in Columbia. Briley Browning will be working at L.J. Hart and Company in Chesterfield, MO as a Financial Analyst.

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.

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.

Mathematics Annual Assessment

2017-2018

Annual Assessment 17-18

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 2016-17

 4

Student Minors 2016-17

 4

Student Majors 2017-18

 5

Student Minors 2017-18

 4

Concentrations 2016-17
If your program contains concentrations, please list the concentrations and the number of students identified within each concentration.

Concentrations 2017-18
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?

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 have entered the program have completed it.   The faculty feels optimal enrollment for the program would be between 10-15 students,

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
R - Reinforced
I - Introduced
M - Master

CURRICULUM MAP(Imported)

	MAT 124	MAT 214	MAT 215	MAT 224	MAT 312	MAT 313	MAT 314	MAT 324	MAT 325	MAT 422	MAT 423	SPR
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 multidimensional space.				I, A, M		R	R					
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(Imported)

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% 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.		

* No Assessment on Objective 2 found

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 - 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.				
Assessment Measures				

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? Not met	Calculus III was not offered during the 2017-18 school year.		

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% of students will achieve a score of 80 percent or higher on the Mathematical Statistics final exam. been met yet? Not met	Mathematical Statistics was not offered during the 2017-18 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? 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.

Assessment Measures

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? Met	4 of 4 (100%) of the students enrolled in MAT 423 achieved a B grade or higher on the 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.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% of the students will achieve a B grade or higher on the class project. been met yet? Not met	Numerical Analysis was not offered during the 2017-18 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? 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.

Assessment Measures

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	Higher Geometry was not offered during the 2017-18 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? Met	All five of the Mathematics majors 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.

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?

Conducted interviews with each Mathematics, Physics, and Pre-Engineering major for the Student Performance Days. The Mathematics faculty members (Chris Schneider, Raymond Hune, and Julie Davenport) interviewed Math majors Briley Browning, Mackenzie Hawkins, Mikayla Maple Laburay, James Rogers, and Bailey Ward; Physics majors Desi DesBouillons II and Aurora Henriksen, and Pre-Engineering majors Sarah Eliason, Taylor Nelson, and Connor Poulson.

Student Performance Review Schedule
Upload the program schedule for students during Performance Reviews.
Student_Performance_day_schedule_2018.xlsx

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?

Senior Mathematics majors Bailey Ward and James Rogers did a presentation on Cryptography from the Numerical Analysis course. As a LEAD event, it allowed other students to get some understand of an application of Mathematics. The seniors were given an opportunity to work on their presentation skills, and the faculty were able to observe this. We plan to give more guidelines to future seniors to improve the quality of future presentations.

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?

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.

The Senior presentation of Bailey Ward and James Rogers was a LEAD event along with other presentations durimng the Senior Showcase days. About 15 students attended.

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.

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.
Professors Julie Davenport and Chris Schneider attended the Missouri Math Pathways Central Regional Symposium on September 29. This was a meeting of college and high school teachers in central Missouri to discuss creating a pathway for students to progress through their college Math courses. There was discussion about the naming of some of the General Education math courses such as College Algebra and Survey of College Math.

Assessment Rubric

	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:	There is only one datapoint for most objectives and it would be helpful for the program to have a minimum of 2 data points for each objective. This could be accomplished if some course based assessment was included in the overall assessment plan. The assessment plan can rotate to match the rotation of the upper level courses, or the program could use Calculus as a baseline as it is taught regularly.				
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:	no changes were recommended or discussed for future assessment. The program is going to continue current practices to create a pool of data to support decision making as their student population is low, they need additional cycles of data to make curricular decisions.				

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.

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.				

Annual Assessment Report

Mathematics

Chris Schneider and Raymond Hune

Annual Assessment Report

Program Profile

	2014-2015	2015-2016
Majors (total, majors 1,2,3)	5	4
Minors	3	4
Concentrations (Add Rows if needed)		
Full Time Faculty		
Part Time Faculty		

*If your discipline has a **secondary education certification component**, you will need to indicate that in the title of this report unless you are submitting a separate report for the education component.*

If your discipline is a major with **one or multiple concentrations, that information needs to be included as separate content. Report the number of declared students by concentration and each concentration will need a separate assessment section.*

Program Delivery (HLC 3A3)

Traditional on-campus _____X_____

Online Program _____

Evening Cohort _____

Analysis:

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 and graduation data what you expected? If yes, what has made for this success? If not, how could they be improved? Consider the students' "time to degree." Does the actual time to degree fit and reflect the program's expected and advertised time? If not, are there ways to align the two?

Outside Accreditation:

There is no outside accreditation for Mathematics.

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Program Action Items

Action Item 1:	Consider further revisions in the Student Performance Day process to better evaluate student performance.
Action steps:	The current procedure is to ask each Math major to complete a personal portfolio and mission statement, and then conduct an individual interview with them to discuss their performance and career and life goals. While the faculty feel this is a useful assessment vehicle, we wonder if there are additional activities that could be considered. Also, we plan to ensure that the Mathematics EST test is administered to the graduating seniors, of which there will be two this academic year.
Timeline	The faculty will consider alternatives during the fall semester and decide which, if any, will be implemented for the Performance Days in March 2016.
Faculty Responsible	Chris Schneider and Raymond Hune will conduct this process.
Completion Date	Student Performance Days scheduled in March 2016.

Action Item 2:	Consider replacing MAT 324 Formal Logic in the Mathematics program with and Advanced Calculus course (or offer the Advanced Calculus course as an elective in the program)
Action steps:	Several changes are being considered, such as a Pre-Engineering program and an Actuarial Science program, so these will need to be weighed as well to see if resources will allow another elective course.
Timeline	This will be discussed through the fall semester and if it is decided to make revisions, submit them by the catalog change deadline.
Faculty Responsible	Chris Schneider and Raymond Hune
Completion Date	Spring 2016

Program Objectives:

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

Objective 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.

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

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

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

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

Objective 7. Accurately use algorithms in appropriate contexts.

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

Program Objectives Matrix

	Obj. 1	Obj. 2	Obj. 3	Obj. 4	Obj. 5	Obj. 6	Obj. 7	Obj. 8
MAT124	I	I	I		I	I		I
MAT214	R	R	R		R	R		R
MAT215	R		R			R	I	
MAT224	R	R	R	I, M, A	R	R		R
MAT312	R	M	R		R	R		R
MAT313	R	R	R	R	M, A	R	R	R
MAT314	R		R	R		R		M, A
MAT324	M		M			M		R
MAT325	M		M			M	M, A	R
MAT422	M		M			M		
MAT423	M		M			A		
External Assessment	A		A		A	A	A	A

I=Introduced   R= Reinforced   M=Mastered   A=Assessed

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Assessment of Program Objectives

Objective 1	Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large.
Methods	A portfolio presentation will be required of all majors for the annual performance days. The Mathematics faculty and invited guest assessors will evaluate the portfolios based on the designed rubric.
Benchmark	80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation.
Data Collected (course specific)	The portfolio presentation will occur during the Students Performance days in February. Data will be collected at that time.
Data Collected (Assessment Day, external tests, Senior Achievement)	
Results	4 of the 5 majors (80%) received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.
Budget needs related to the objective?	The only budget issues related to this would be payment for any outside assessors brought to campus.

Objective 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.
Methods	A senior project will be required of all graduating majors, reviewing what they have learned during their time at William Woods.

Benchmark	Successfully completing the senior project.
Data Collected (course specific)	We will have two graduating seniors in Spring 2016. They will complete the project at that time.
Data Collected (Assessment Day, external tests, Senior Achievement)	Seniors will complete the project during their final semester on campus and present their results during the Senior Achievement Days.
Results	Our two graduating seniors, Anne Wehner and Kiersten Lockman, worked as a team to complete the project. They also presented the project together during the Senior Achievement Days on April 19. Since this was a LEAD event, there were several students and other faculty present.
Budget needs related to the objective?	There were no budget needs for this objective.

Objective 3	Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.
Methods	A portfolio presentation will be required of all majors for the annual performance days. The Mathematics faculty and invited guest assessors will evaluate the portfolios based on the designed rubric.
Benchmark	80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation.
Data Collected (course specific)	The portfolio presentation will occur during the Students Performance days in February. Data will be collected at that time.
Data Collected (Assessment Day, external tests,	

Senior Achievement)	
Results	4 of the 5 majors (80%) received a score of 3 or higher on the 4 point scale for the Mathematics assessment rubric.
Budget needs related to the objective?	The only budget issues related to this would be payment for any outside assessors brought to campus.

Objective 4	Analyze situations involving multiple objects and constraints using multidimensional space.
Methods	The Calculus III (MATH 224) final exam, as Calculus III is a course concerned with multidimensional spaces.
Benchmark	80% of students will achieve a score of 80 percent or higher on the Calculus III final exam.
Data Collected (course specific)	Calculus III will not be offered in the 2015-16 school year.
Data Collected (Assessment Day, external tests, Senior Achievement)	
Results	Calculus III will next be offered in Spring 2017.
Budget needs related to the objective?	There should be no budget needs related to this objective.

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

Methods	The final exam of the Mathematical Statistics course (MATH 313).
Benchmark	80% of the students will achieve a score of 80 percent or higher on the Mathematical Statistics final exam.
Data Collected (course specific)	Mathematical Probability and Statistics will not be offered in the 2015-16 school year.
Data Collected (Assessment Day, external tests, Senior Achievement)	
Results	Mathematical Probability and Statistics will next be offered in Spring 2017.
Budget needs related to the objective?	There should be no budget needs related to this objective.

Objective 6	Exhibit competence in various methods of analytic proof.
Methods	The final exam in the Number Theory (MATH 423) course.
Benchmark	80% of the students will achieve a B grade or higher on the final exam.
Data Collected (course specific)	MATH 423 was offered in Fall 2015. It was also offered as a tutorial in Spring 2016 for a student who was not a Mathematics major.
Data Collected (Assessment Day, external tests, Senior Achievement)	Final exam in the MATH 423 course.

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Results	3 out of 3 (100%) of the students achieved a B grade or higher on the final exam.
Budget needs related to the objective?	None.

Objective 7	Accurately use algorithms in appropriate contexts.
Methods	A course project will be assigned in the Numerical Analysis course (MATH 325).
Benchmark	80% of the students will achieve a B grade or higher on the class project.
Data Collected (course specific)	Numerical Analysis will not be offered in the 2015-16 school year.
Data Collected (Assessment Day, external tests, Senior Achievement)	
Results	Numerical Analysis will next be offered in the Fall 2016 semester.
Budget needs related to the objective?	There should be no budget needs related to this objective.

Objective 8	Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.
Methods	A project/case study will be assigned in the Higher Geometry (MATH 314) course.

Benchmark	80% of the students will achieve a score of 75 or higher on this project.
Data Collected (course specific)	Each student will complete the project and these will be assessed to obtain the overall score.
Data Collected (Assessment Day, external tests, Senior Achievement)	
Results	Higher Geometry was offered in Spring 2016 and 4 of 5 (80%) of the students enrolled successfully completed the project with a grade of 75 or higher.
Budget needs related to the objective?	There should be no budget needs related to this objective.

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.

General Education Assessment:

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)

Program Activities:

Student Performance Day Activities (Assessment Day):

On February 16, the Mathematics faculty held individual interviews with each major as has been done in past years. Each student was asked to prepare a personal mission statement and portfolio of their academic career to this stage. They were asked to dress professionally to be interviewed by Professors Hune and Schneider, along with adjunct faculty member Jim Wayne.

On February 17, the first induction ceremony for the Missouri Xi chapter of Kappa Mu Epsilon was held. The National President of KME, Dr. Rhonda McKee of the University of Central Missouri, came to William

Woods to initiate our chapter. Our first two inductees were Kiersten Lockman and Anne Wehner. Several faculty and students also attended the ceremony, and enjoyed cake and refreshments afterward. Our chapter is the 17th to be initiated in the state of Missouri since KME was founded in 1931.

Seniors Anne Wehner and Kiersten Lockman both took the Mathematics Major Field Test (MST) in March. This is the first time our students have taken the MFT. Results were not obtained by the end of the semester.

Senior Achievement Day Presentations:
Our graduating seniors, Kiersten Lockman and Anne Wehner, both participated in the Senior Achievement Days on April 19. Together they presented the procedure to solve a tank mixture problem, which is a classic example of a linear differential Equation that is solved with the use of an integrating factor. They also discussed some of the cryptology techniques that were discussed in the Number Theory course. Several students attended the presentation, and they were able to gain an appreciation for practical applications of Mathematics. The seniors were also presented with their certificates and honor cords for being members of Kappa Mu Epsilon.

Service Learning Activities:
There have been no Service Learning Activities for Mathematics.

Program Sponsored LEAD Events:
Mathematics has not sponsored any LEAD events so far this year. The senior presentations during the Senior Achievement Days (described above) were attended by several students for LEAD credit.

Student Accomplishments:
Kiersten Lockman and Anne Wehner became the first inductees into the new Missouri Xi chapter of Kappa Mu Epsilon Mathematics honors society, based on the William Woods campus.

Faculty Accomplishments:
Chris Schneider and Raymond Hune were both promoted to the rank of Assistant Professor.

Alumni (Recent Graduates) Accomplishments (past year graduating class):
Ryan Yuengel, who graduated in December, has not pursued any graduate study or obtained work in the Mathematics field, but continues to live in the area.

Annual Assessment Report

Mathematics

Chris Schneider and Raymond Hune

Annual Assessment Report

Program Profile

	2013-2014	2014-2015
Majors (total, majors 1,2,3)	7	5
Minors	4	3
Concentrations (Add Rows if needed)		
Full Time Faculty		
Part Time Faculty		

Program Delivery (HLC 3A3)

Traditional on-campus _____X_____

Online Program _____

Evening Cohort _____

Analysis:

Program goals for student retention, persistence and degree completion are? Consider the students' "time to degree." Does the actual time to degree fit and reflect the program's expected and advertised time? If not, are there ways to align the two?

Outside Accreditation:

There is no outside accreditation agency for Mathematics.

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Program Action Items

Action Item 1:	Develop the (MAT314) Higher Geometry course project.
Action steps:	Higher Geometry will be taught as a tutorial in Spring 2015 for one student who is a non-major. This will allow an opportunity for the project to be implemented as a pilot to see if useful assessment data is obtained.
Timeline	The project was given in the Spring 2015 semester.
Faculty Responsible	Chris Schneider, who will teach the tutorial section of MAT314.
Evaluation	The student in tutorial section of MAT314 in Spring 2015 did complete the project for Higher Geometry. As the student was not a Math major, we will reassess the process and administer the project the next time the course is taught (in the 2015-16 year), when Math majors will also be taking the course.

Action Item 2:	Consider implementing an EST test to assist in assessment of our majors.
Action steps:	The Mathematics faculty plan to administer some type of standardized test during the Student Performance Days in Spring 2016. The faculty will work with Carrie McCray to see what options are available and which would be best suited for our majors.
Timeline	The Mathematics Major Field test was selected as an assessment instrument. The initial plan was to administer the exam in Spring 2015, but it will now be done in the 2015-16 year.
Faculty Responsible	Chris Schneider and Raymond Hune. Carrie McCray has set aside funding in her budget for the cost of the exams.
Evaluation	The two graduating seniors did not complete the Major Field test due to difficulties in finding a time to take the exam between class conflicts and athletic events. We will ensure that the seniors next year will take the Major Field Test in Mathematics.

Program Objectives: (from most recent Assessment Plan)

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

Objective 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.

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

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

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

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

Objective 7. Accurately use algorithms in appropriate contexts.

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

Program Objectives Matrix (from most recent Assessment Plan)

	Obj. 1	Obj. 2	Obj. 3	Obj. 4	Obj. 5	Obj. 6	Obj. 7	Obj. 8
MAT124	I	I	I		I	I		I
MAT214	R	R	R		R	R		R
MAT215	R		R			R	I	
MAT224	R	R	R	I, M, A	R	R		R
MAT312	R	M	R		R	R		R
MAT313	R	R	R	R	M, A	R	R	R
MAT314	R		R	R		R		M, A
MAT324	M		M			M		R
MAT325	M		M			M	M, A	R
MAT422	M		M			M		
MAT423	M		M			A		

Assessment of Program Objectives

Objective 1	Apply mathematical concepts, methods and tools in solving problems pertaining to the world at large.
Methods	A portfolio presentation will be required of all majors for the annual performance days. The Mathematics faculty and invited guest assessors

	will evaluate the portfolios based on the designed rubric.
Benchmark	80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation.
Data Collected (course specific)	The Assessment Rubric for the portfolio presentation and interviews is attached at the end of the report. Also attached is the instruction sheet given to each major to prepare their portfolio. We had a total of five interviews this year.
Data Collected (Assessment Day, external tests, Senior Achievement)	Each major will prepare a portfolio and participate in an individual interview during the Student Performance Days in March 2015. They will be scored on the attached rubric.
Results/Outcomes	Each Mathematics major participated in the Student Performance Day interviews, and the rubrics were scored and recorded. All five of the students (100%) scored 3 or higher on the portfolio presentation, exceeding the benchmark.
Proposed changes to the assessment process	The faculty plan to also implement a Major Field test for Mathematics to further gauge student progress. The faculty does not feel changes are needed in the portfolio or the individual interviews.
Budget needs related to the objective?	We plan to administer the Major Field test to the graduating seniors in the 2015-16 school year. There should not be any budget needs in administering the exams, as we already have enough copies of the tests for the two seniors graduating next year.

Objective 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.
Methods	A senior project will be required of all graduating majors, reviewing what they have learned during their time at William Woods.
Benchmark	Successfully completing the senior project.
Data Collected	The faculty implemented the senior project with this year's graduating

(course specific)	seniors. As Mathematics does not have a capstone course, the students will meet individually with Chris Schneider, but will be expected to primarily complete it on their own time.
Data Collected (Assessment Day, external tests, Senior Achievement)	The seniors will complete the project during their final semester at William Woods, and then present their results during the Senior Performance Days.
Results/Outcomes	The seniors in Spring 2015 completed a senior portfolio similar to what has been done in the past. With both seniors not taking any Math courses and both being athletes, there was difficulty in getting enough time to meet to be able to complete the modified senior project idea.
Proposed changes to the assessment process	There will be two seniors graduating next year, both who will be taking classes in their last semester. This should make it easier to meet and discuss the process of preparing the project. We will reassess the project idea after the coming year. Another possible solution would be to develop a capstone course for Mathematics where time could be devoted to the senior project.
Budget needs related to the objective?	There are no budget needs specific to the senior project.

Objective3	Identify and demonstrate pattern and structure inherent in performing different operations on mathematical objects.
Methods	A portfolio presentation will be required of all majors for the annual performance days. The Mathematics faculty and invited guest assessors will evaluate the portfolios based on the designed rubric.
Benchmark	80% of the students will receive a score of 3 or higher on a 4 point scale for portfolio presentation.
Data Collected (course specific)	The Assessment Rubric for the portfolio presentation and interviews is attached at the end of the report. Also attached is the instruction sheet given to each major to prepare their portfolio. We had a total of five

	interviews this year.
Data Collected (Assessment Day, external tests, Senior Achievement)	Each major will prepare a portfolio and participate in an individual interview during the Student Performance Days in March 2015. They will be scored on the attached rubric.
Results/Outcomes	Each Mathematics major participated in the Student Performance Day interviews, and the rubrics were scored and recorded. All five of the students (100%) scored 3 or higher on the portfolio presentation, exceeding the benchmark.
Proposed changes to the assessment process	The faculty plan to also implement a Major Field test for Mathematics to further gauge student progress. The faculty does not feel changes are needed in the portfolio or the individual interviews.
Budget needs related to the objective?	We plan to administer the Major Field test to the graduating seniors in the 2015-16 school year. There should not be any budget needs in administering the exams, as we already have enough copies of the tests for the two seniors graduating next year.

Objective 4	Analyze situations involving multiple objects and constraints using multidimensional space.
Methods	The Calculus III (MATH 224) final exam, as Calculus III is a course concerned with multidimensional spaces.
Benchmark	80% of students will achieve a score of 80 percent or higher on the Calculus III final exam.
Data Collected (course specific)	Calculus III (MATH 224) will be offered in the Spring 2015 semester. The final exam will be administered and data will be collected at that time. The current course rotation calls for MATH 224 to be offered in odd years during the spring semester.
Data Collected (Assessment Day, external tests,	MATH 224 was offered in Spring 2015, and all of the students took the final exam in the course.

Senior Achievement)	
Results/Outcomes	All of the students (100%) scored 80 percent or higher on the final exam, exceeding the stated benchmark.
Proposed changes to the assessment process	The faculty will review the assessment process over the summer with the new data in mind. We will consider whether the originally stated benchmark needs to be adjusted.
Budget needs related to the objective?	No budget needs are anticipated for this objective.

Objective 5	Demonstrate the dependence or independence of mathematical statements upon their axiomatic framework.
Methods	The final exam of the Mathematical Probability and Statistics course (MATH 313).
Benchmark	80% of the students will achieve a score of 80 percent or higher on the Mathematical Statistics final exam.
Data Collected (course specific)	Mathematical Probability and Statistics (MATH 313) will be offered in the Spring 2015 semester. The final exam will be administered and data will be collected at that time. The current course rotation calls for MATH 313 to be offered in odd years during the spring semester.
Data Collected (Assessment Day, external tests, Senior Achievement)	MATH 313 was offered in Spring 2015, and all of the students took the final exam in the course.
Results/Outcomes	All of the students (100%) achieved a score of 80 percent or higher on the final exam, exceeding the goal of the objective.
Proposed changes to the assessment	The faculty will review the assessment process over the summer with the new data in mind. We will consider whether the originally stated

process	benchmark needs to be adjusted.
Budget needs related to the objective?	No budget needs are anticipated for this objective.

Objective 6	Exhibit competence in various methods of analytic proof.
Methods	The final exam in the Number Theory (MATH 423) course.
Benchmark	80% of the students will achieve a B grade or higher on the final exam.
Data Collected (course specific)	The five Mathematics majors in MATH 423 in the Fall 2013 semester all achieved a grade of 80% or higher on the final exam. There was no separate rubric for this other than the scoring of the exam. The course will be next offered in the 2015-16 school year.
Data Collected (Assessment Day, external tests, Senior Achievement)	No data will be collected this year, as the course will not be offered.
Results/Outcomes	In Fall 2013, 100% of the Mathematics majors achieved the stated benchmark on the final exam, exceeding the required 80%. No further outcomes will be obtained this year.
Proposed changes to the assessment process	No changes are proposed to this objective at this time. MATH 423 will be offered in the Fall 2015 semester, so this objective will be assessed again at that time.
Budget needs related to the objective?	No budget needs are anticipated for this objective.

Objective 7	Accurately use algorithms in appropriate contexts.
Methods	A course project will be assigned in the Numerical Analysis course

	(MATH 325).
Benchmark	80% of the students will achieve a B grade or higher on the class project.
Data Collected (course specific)	MATH 325 was offered in Fall 2014 and the course project was assigned.
Data Collected (Assessment Day, external tests, Senior Achievement)	The five Mathematics majors in MATH 325 in the Fall 2014 semester all achieved a B grade or higher on the course project. This was a 100% rate, exceeding the benchmark of 80%.
Results/Outcomes	100% of the Mathematics majors achieved the stated benchmark on the Numerical Analysis course project, exceeding the required 80%.
Proposed changes to the assessment process	The course project went well and appears to be a good tool for assessment for this objective. No changes are proposed at this time. The course will not be offered during the 2015-16 year.
Budget needs related to the objective?	No budget needs are anticipated with this objective.

Objective 8	Demonstrate the existence of numerical, geometric, and symbolic trends and make conjecture based on those trends.
Methods	A project/case study will be assigned in the Higher Geometry (MATH 314) course.
Benchmark	80% of the students will achieve a score of 75 or higher on this project.
Data Collected (course specific)	MATH 314 was offered in Spring 2015, but only as a tutorial to one student, who was not a Mathematics major.
Data Collected (Assessment Day, external tests, Senior	The one student in MATH 314 did complete the project.

Achievement)	
Results/Outcomes	The one student did score above 75%, however due to the small sample size we do not feel we can realistically say the benchmark was exceeded.
Proposed changes to the assessment process	MATH 314 will be offered again in the Spring 2016 semester, and it is likely there will be Math majors enrolled in the class this time. The project will be administered again, and reassessed afterwards, with more data at hand.
Budget needs related to the objective?	No budget needs are anticipated for this objective.

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 plan to add an outside assessment tool, the Mathematics Major Field Test, in the 2015-16 year. This will allow better comparisons between William Woods Mathematics students and students at other institutions. The outside reviewer for the Mathematics five year program review indicated that they felt this would be a necessary step. (HLC 4B1).

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

The student interviews administered during the Student Performance Days again resulted in positive outcomes for all of the majors. The interviews appear to be taken seriously, and the students have commented that they find them useful in gauging their success and also in preparing them for formal interviews later in their careers.

Program Changes Based on Assessment:

The Mathematics faculty is planning to implement a Mathematics Major Field Test as another gauge of student performance. This test will be administered to each major during the annual Student Performance Days.   Each major's performance on the test will be tracked through their academic career to measure their improvement as they progress through the program. The cost of the exam will be covered through the office of the Dean of Assessment. The faculty feel this will provide a more quantitative assessment, as well as one that can be compared to outside programs.

The faculty has also 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.

General Education Assessment:

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)

Program Activities:
Student Performance Day Activities (Assessment Day):
The faculty will discuss the results of the 2015 Student Performance Day in the May revision of this report.

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Senior Achievement Day Presentations:
The two graduating seniors, Kacey Scharnhorst and Julian Taylor, completed a senior portfolio, an overall reflection of their career at William Woods and what topics they found most interesting in their Mathematics courses.

Service Learning Activities:
There are no courses in Mathematics with a Service Learning component.

Program Sponsored LEAD Events:
No Mathematics LEAD events were offered in the 2014-15 year. Professor Vern Hart did offer several Science related events, including a poster session on the History of Science, a general overview of the process of obtaining a graduate degree in the sciences, and also a presentation of student research.

Student Accomplishments:
We did not have any Mathematics specific accomplishments by the Math majors in the 2014-15 year.

Faculty Accomplishments:
Professors Hune and Schneider attended the Missouri Math Summit in September. The primary topic of discussion was placing students in the General Education class that best fits the student's needs, a discussion we have been dealing with for several years in promoting MAT 112 Survey of College Math over MAT 118 College Algebra.

Professor Hart organized a Science Demonstration team that visited area public schools, giving demonstrations of scientific experiments and promoting the Sciences in general.

Alumni (Recent Graduates) Accomplishments (past year graduating class):
We have not received any updates on May 2014 graduate Katie Shikles. Her plans were to attend Columbia College and pursue a Master's Degree in Accounting/Business Administration.

To: Mathematics majors

From: Mathematics faculty: Chris Schneider and Raymond Hune

Re: Student Performance reviews of Mathematics majors for Spring 2015

William Woods University is in an ongoing process of annual assessment of each student enrolled in a degree program on campus. We will be assessing your progress in the Mathematics major during the upcoming Student Performance Days. The assessment will again cover two days this year. The traditional assessment that we have done in past years will be held on Wednesday, March 4. On Tuesday, March 3, we will have a lunch time meeting with all of the majors. Senior Mathematics majors will also complete a Major Field Test. Participation is a requirement of the Mathematics program.

PURPOSE

The annual assessment of all Mathematics students allows the division and its students as individuals to work toward the most professional and highest quality outcomes possible. We will provide you with a written report of your review after completion of the process. This report will include an assessment of where you stand based on faculty expectations appropriate to your year of study, and recommendations designed to aid in the achievement of your personal goals. The information that you provide will be placed with the faculty report in a permanent file and updated annually throughout your college years. The division will benefit from an overall assessment of student work, providing an understanding of curricular strengths and weaknesses. We also hope to improve the curriculum based on these assessments.

PROCESS

- By **March 2, 2015,** prepare a Mathematics Portfolio containing the following information and email copies to chris.schneider@williamwoods.edu.
- On **March 4, 2015**, you will meet with the Mathematics faculty and outside assessors for a formal review of the materials you have provided in your Mathematics Portfolio. A sign-up sheet will be available ahead of this date for you to schedule your individual appointment. No classes will be held on this day. *Students are expected to come dressed for this interview as they would if they were having a job interview or applying for a graduate program.* The review is intended to be non-confrontational and beneficial for both students and faculty.

Your Mathematics Portfolio should include:

A.   **A Personal Mission Statement**

Most organizations, including William Woods University, have Mission Statements. They give their directors, all who work for them, and potential clients, an idea about who they are: their goals, what they hope to accomplish, how they are going to accomplish these goals, what their

standards are, and what their vision is. (You can easily find the campus Mission Statement on the William Woods home page, and it is also included on all of the Mathematics course syllabi.) You can use this as a model of how you develop your own personal Mission Statement.

Some questions you might want to consider are:

- *Who am I?*
- *Why am I a Mathematics major? Do I have a passion for this field?*
- *How does the Mathematics major relate to my career goals?*
- *Will I find enough challenge/excitement/fulfillment/fun in this field to sustain me and meet my personal goals beyond making a living?*

Of course, this will take some time and reflection. Start on it, set it aside, and then come back to it in a day or two. It should be about one paragraph in length. (Don't worry—this doesn't have to be forever. Next year you may wish to change it!)

B. Coursework

You should consider the following information related to the courses you have taken so far in your college career:

- Prepare a list of the Mathematics courses taken with the grade you received in each course. Include any other courses taken that you feel are relevant to your Mission.
- Describe how the content of these courses relates to your goals. Include examples of how the content in the various courses relate to one another.
- Describe one or two particular areas of study associated with your coursework that are particularly valuable to you.

C. List of Activities

Other than coursework, list your most significant activities or experiences and explain how they have benefited your Mission. Activities may include internships and other employment, research, volunteer work, special projects, retreats, conferences or presentations you have attended.

ASSESSMENT OF PROGRESS

In addition to the written documents, you should be prepared to respond verbally to questions asked by the Mathematics faculty and outside assessors regarding basic concepts and methodology in Mathematics that you are expected to have mastered by your current year in this major. (All of your course syllabi will have goals for that course and for the Mathematics major.)

Please do not hesitate to contact us if you have any questions regarding the assessment process.

Chris Schneider and Raymond Hune

Mathematics faculty