Assessment Report AY 2018-2019

Mathematics **B.A.**
(Instructional Degree Program) (Degree Level)

Program Mission:
The mission of the Mathematics Program at New Mexico Highlands University is to provide students with a challenging, market relevant and high-quality education in mathematics. Students completing the baccalaureate program in mathematics will be well prepared for their first position in the field. Each mathematics graduate will be capable of independent thought and initiative in the field of mathematics. Each graduate will demonstrate the behavior and attitudes of a professional in the field and be capable of performing the technical tasks required of their field.

Student Learning Outcome 1:

Understanding and demonstrating mastery of basic algebraic skills (Math 120) as well as more advanced algebraic technique and concepts (Math 140).

NMHU Traits Specifically Linked to Student Learning Outcome 1

- Mastery of Content Knowledge and Skills

First Means of Assessment for Outcome 1:

Final grade from Math 1215: Intermediate Algebra. Students' mastery will be measured by the cumulative percentage of passing grades for all sections of the course offered in Fall 2017 and Spring 2018.

Summary of Data:

Number of Students Meeting Criterion:	122	Number of Students Not Meeting Criterion:	66
Total Number of Students Assessed:	188	Percent of Students Meeting Criterion:	64.9%

Second Means of Assessment for Outcome 1:

Final grade from Math 1220: College Algebra Students mastery will be measured by the cumulative percentage of passing grades for all sections of the course offered in Fall 2017 and Spring 2018.

Summary of Data:

Number of Students Meeting Criterion:	83	Number of Students Not Meeting Criterion:	42
Total Number of Students Assessed:	125	Percent of Students Meeting Criterion:	66.4%

Interpretation of Results for Outcome 1:

64.9% of students taking Math 120 and 66.4% of students taking Math 140 in Fall 2018 and Spring 2019 passed these courses respectively. This appears to be a poor result for both Math 120 and Math 140, though still somewhat consistent with passing rates from other colleges and universities throughout the country. Nevertheless, this improved upon results from the previous academic year by passing rate that increased by almost 10% for each of these courses. NMHU is an open enrollment university, so often our students are fundamentally challenged with basic, entry-level numeric and algebraic skills. The challenge to the mathematics program is to construct a sequence of courses viable for liberal arts students to satisfy core requirements and a sequence of fundamental courses preparing STEM students for higher level study in mathematics and STEM. Most students entering Math 120 test at the 4^{th} grade level of understanding (sometimes less than that). It is worth considering offering a Math 100 course to respond to these deficits. It could possibly be an 8-week course for 2 or 3 credits.

Change to Program Based on Results:

The mathematics department is considering offering a Math 100 course to

respond to the lack of background knowledge of our students in Math 120. It could possibly be an 8-week course for 2 or 3 credits. Math 140 should be for STEM students. Non-STEM students should be encouraged to take Math 145 (Intro to Statistics). The department has also retained new contract faculty to teach these two courses – both instructors have considerable experience teaching this material, and they have successful track records evidencing improved student performance.

Student Learning Outcome 2:

Effectively understand and demonstrate competence and proficiency with analytic geometry, algebraic manipulation of formulas and equations, rates of change and applications of the derivative and the integral; effectively be able to write proofs in Math 317.

NMHU Traits Specifically Linked to Student Learning Outcome 2

- Critical and Analytic Thinking Skills
- Algebraic Competence

First Means of Assessment for Outcome 2:

Math 211: Calculus 1 Students' ability to successfully demonstrate proficiency with the topics and concepts in this course will be measured by an achievement of a passing grade.

Summary of Data

Number of Students Meeting Criterion:	30	Number of Students Not Meeting Criterion:	12
Total Number of Students Assessed:	42	Percent of Students Meeting Criterion:	71.4%

Second Means of Assessment for Outcome 2:

Math 252: Calculus 2. Students' ability to successfully demonstrate proficiency with the topics and concepts in this course will be measured by the achievement of a passing grade.

Summary of Data:

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	8
Total Number of Students Assessed:	15	Percent of Students Meeting Criterion:	46.7%

Third Means of Assessment for Outcome 2:

Math 3170: Discrete Mathematics. Students' ability to successfully demonstrate proficiency with the topics and concepts in this course will be measured by the achievement of a passing grade.

Summary of Data:

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	2
Total Number of Students Assessed:	9	Percent of Students Meeting Criterion:	77.8%

Interpretation of Results for Outcome 2:

Mathematics and STEM students continue to perform well with the material in Calculus 1 and Discrete Mathematics, however those in Calculus 2 still continue to experience difficulty. This may be due to increased demands of algebraic sophistication. Still, there is evidence of evolved mathematical maturity in so far as effectively communicating solutions to problems and constructing logical arguments in writing proofs for Math 3170. These courses are a bridge to the more demanding sophisticated higher level courses offered for the major.

Change to Program Based on Results:

Results in Calculus 1 and Discrete Mathematics are consistent with the previous

academic year. The overall pass rate is acceptable and conceptual understanding of the topics continues to be strong for students. For future Calculus 2 courses, more time and effort will be required to allow students the opportunity to practice fundamental concepts and ideas. There is a lot of material to be covered in this course. Perhaps slowing down and excluding some topics in favor of devoting greater time and attention to the more fundamental ideas might be beneficial.

Student Learning Outcome 3:

Effectively process more abstract and theoretical mathematical ideas and concepts, and effectively construct and write mathematical proofs associated with these concepts.

NMHU Traits Specifically Linked to Student Learning Outcome 3

- Mastery and Interpretation of Abstract Analytic Mathematical Concepts
- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills

First Means of Assessment for Outcome 3:

Math 4250: Introduction to Real Analysis: Students ability to construct and transcribe meaningful and logically correct mathematical proofs, as well as processing abstract theoretical concepts and ideas will be measured by the achievement of a passing grade.

Summary of Data

Number of Students Meeting Criterion:	0	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	0	Percent of Students Meeting Criterion:	0.0%

Second Means of Assessment for Outcome 3:

Math 4210: Applied Abstract Algebra: Similar to Math 425, students are asked to construct mathematical proofs in relation to concepts involving abstract algebraic

structures. Students ability to demonstrate mastery of proof-writing and abstract interpretive skills will be measured by the achievement of a passing grade.

Summary of Data

Number of Students Meeting Criterion:	0	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	0	Percent of Students Meeting Criterion:	0.0%

Interpretation of Results for Outcome 3:

Math 4250 and Math 4210 will be the designated courses to assess proficiency and competence for mathematics major. For the academic year Fall 2018/Spring 2019, these courses were not offered.