

**Institutional Effectiveness
2023-2024**

Program: Mathematics MS

College and Department: College of Arts and Sciences, Department of Mathematics

Contact: Michael Allen

Mission:

In alignment with Tennessee Tech’s Vision and Mission statements, the Department of Mathematics will foster students’ tenacity and analytical abilities through the offering of a wide variety of math courses, innovative teaching and research, and service, both public and institutional. As a central part of a STEM-infused comprehensive institution, the Department of Mathematics will create successful learners of mathematics in the university community and in the region. Learning opportunities will be provided to students of all disciplines to advance their understanding of mathematical concepts through effective use of analytical practices and critical thinking. More specifically, the Department will provide its majors with a thorough foundation in mathematics and the flexibility to prepare for a variety of careers through the opportunity to study multiple areas of mathematics.

Attach Curriculum Map (Educational Programs Only):

Here is the current curriculum map for the Masters in Mathematics at Tennessee Tech. As one can see, the map leaves room for the student to pursue their own path but with the stipulation Algebra and Analysis are taken.

MS in MATH Curriculum Map

	Courses & Degree Requirements			
Student Learning Outcomes	MATH 6110 (3 cr hours of Algebra)	MATH 6410, 6310 or 6010 (3 cr hours of Analysis)	Minimum of 30 graduate credit hours in MATH	3 Required Sequences and passing 2 comprehensive exam or 2 Required Sequences & Thesis
Students will demonstrate breadth of mathematical knowledge	X	X	X	X
Students will demonstrate depth of mathematical knowledge			X	X

Program Goal 1: Ideal Number of Graduate Students

Define Outcome:

The Mathematics Masters program will grow and continue to recruit and retain an optimal number of students who major in Math.

Assessment Methods:

The Department will track the number of students applying to, admitted to, and graduating from our Masters program.

Criteria for Success (Thresholds for Assessment Methods):

The Department of Mathematics strives for a at least 15 applicants per year with at least 5 admitted per year and 5 graduated per year.

Link to 'Tech Tomorrow' Strategic Plan:

2.A Technology Infused Programs,2.B Research, Scholar, Intellect, and Creativity,3.A Efficiency and Effectiveness,4.C Network of Scholars

Results and Analysis:

Semester	Summer 2020	Fall 2020	Spring 2021	Summer 2021	Fall 2021	Spring 2022	Summer 2022	Fall 2022	Spring 2023	Summer 2023	Fall 2023	Spring 2024	Summer 2024
Number of Applicants	5	1	6	0	3	5	0	2	5	1	2	12	7
Numbers of Admits	4	1	6	0	3	4	0	1	5	1	0	4	2
Number of Admits Registered	0	0	3	0	2	4	0	0	4	0	0	4	2
Number of Masters Graduates	1	0	4	0	1	1	0	0	3	0	4	1	0

Use of Results to Improve Outcomes:

It is blatantly obvious the Department needs to recruit so it can graduate Masters in Mathematics. Hopefully, the latest enrollment numbers will continue to rise but the Department will be creating a game plan to help those number increase.

Program Goal 2: Extracurricular Activities

Define Outcome:

Mathematics graduate students will participate in extracurricular activities, like workshops, conferences and outreach events, related to mathematics.

Assessment Methods:

The Department will track the number and types of activities attended by our graduate students.

Criteria for Success (Thresholds for Assessment Methods):

The Department would like to see 50% or more of our graduate students participate in outreach, conferences, and other extracurricular activities related to their discipline.

Link to 'Tech Tomorrow' Strategic Plan:

2.B Research, Scholar, Intellect, and Creativity, 4.C Network of Scholars

Results and Analysis:

Along with having four meetings this year of our math club, of which graduate students may be members, one of our faculty members held a question-and-answer session on Quantum computing. Another faculty member took three graduate students to an Actuary conference of which all three presented a poster. Our graduate students also volunteered for the Tennessee Math Teachers Association high school and middle school math contest hosted annually by the Department. Unfortunately, the contest was cancelled because of the high probability of severe weather that day.

Use of Results to Improve Outcomes:

The Department did more outreach than last year but can do more. The results above need to be doubled this year and the faculty will be encouraged to promote even more extracurricular activities.

Student Learning Outcome 1: Knowledge of Graduate-Level Algebra and Analysis

Define Outcome:

All MS in Mathematics graduates will demonstrate knowledge of graduate-level Algebra and Analysis.

Assessment Methods:

The graduate advisor will track the percentage of students who answer correctly common questions given in their graduate exams.

Criteria for Success (Thresholds for Assessment Methods):

The Department will strive for a better than 75% pass rate on these common questions.

Link to 'Tech Tomorrow' Strategic Plan:

2.B Research, Scholar, Intellect, and Creativity

Results and Analysis:

All five graduates of the 2023-24 academic year demonstrated a breadth of knowledge of mathematics by completing Math 6110 - Abstract Algebra and a 6000-level course in Analysis. Most answered the Algebra and Analysis questions posed to them during their oral exams satisfactorily while three students were able to answer the problems completely. This was to be expected given only one student earned A's in both Algebra and Analysis while another earned only an A in Algebra.

Use of Results to Improve Outcomes:

Last year the graduate faculty did discuss how better to assess this knowledge. One small movement was to record the question stated during the oral exam. This assessment will be looked at again to better clarify its rubric and how to gather the results.

Student Learning Outcome 2: Depth of Knowledge in an Area of Mathematics**Define Outcome:**

All MS in Mathematics graduates will demonstrate a depth of knowledge in an area of mathematics.

Assessment Methods:

The Department will track the pass rate for the oral and comprehensive exams for their Masters students.

Criteria for Success (Thresholds for Assessment Methods):

The Department will strive for a 100% pass rate.

Link to 'Tech Tomorrow' Strategic Plan:

2.B Research, Scholar, Intellect, and Creativity

Results and Analysis:

All five 2023-25 graduates completed a thesis and demonstrated a depth of knowledge by defending their theses and having them approved by their advisory committees. The attached files contain the rubric used by the thesis committees to assess student mastery of thesis topics and the oral exam portion of the thesis defense. The students' names have been removed for anonymity.

Attached Files

[Results Oral Exams Masters 2023 2024.pdf](#)

Use of Results to Improve Outcomes:

Last year the graduate faculty decided to continue this rubric for one more year while another assessment was discussed. Otherwise, the five students all did quite well on their thesis defenses.

Summative Evaluation:

The areas of concern include the recruitment of new graduate students, the assessment of their knowledge when they are near graduation, and the number of extracurricular activities.

Assessment Plan Changes:

The assessment of the students' knowledge will be addressed by the graduate faculty this year.

List of Appendices:

Appendix 1: SLO2 Results – Rubric for Master’s Defenses/Oral Exams

