

## **Math MS: 2018-2019**

### **Definition of Unit**

#### **Providing Department:**

Mathematics MS

#### **Department/Unit Contact:**

Allan Mills

#### **Mission/Vision Statement:**

All undergraduate degree programs at Tennessee Tech require at least one course in mathematics and many require several courses. The Department of Mathematics provides a variety of general education courses, introductory and advanced undergraduate courses in support of STEM majors, and graduate-level courses for the MS in mathematics and other graduate programs.

As a central part of a STEM-infused comprehensive institution, the Department of Mathematics strives to create successful learners of the subject of mathematics in the university community and in the community where we live. Learning opportunities are provided to students of all disciplines to advance their understanding of mathematical concepts and their effective use of analytic practices and critical thinking as useful in their studies and everyday life. The departmental faculty conduct research in mathematics and as part of interdisciplinary teams and provide service to the department, college, University, and mathematical community.

The mission of the TTU Department of Mathematics is to promote the learning of mathematics through effective teaching, research, and public service. Such learning opportunities are provided to students of all disciplines in support of the mission of the University.

## Goal 1. Average at least 5 graduates per year

### Define Goal:

The MS in Mathematics degree program will average at least 5 graduates per year

### Intended Outcomes / Objectives:

DRILL DOWN-----

RELATED ITEM LEVEL 1

### Assessment- Goal 1: Count of the number of MS in Mathematics graduates in the previous July 1-June 30 time period

#### Frequency of Assessment:

annually

#### Rationale:

The number of students earning the MS in Mathematics in the previous year is determined and trends are tracked using a 5-year average of the number of graduates.

Threshold of Acceptability: Five-year running average of 5 graduates per year

RELATED ITEM LEVEL 2

### Results- Goal 1: Number of Graduates per Year

#### Results:

The MS in MATH program graduated 3 students during the 2018-19 academic year which is below our target of graduating 5 students each academic year. For the most recent five academic years the program is averaging 5.6 graduates per year. We anticipate having 6 graduates for the upcoming 2019-20 academic year.

Number of Degrees Awarded July 1-June 30

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Male	2	2	5	1	4	7	2	1	2
Female	1	0	0	0	2	2	4	3	1
Total MS in MATH	3	2	5	1	6	9	6	4	3

#### Attachments:

RELATED ITEM LEVEL 3

## **Modification- Goal 1: Average at least 5 graduates per year**

### **Program Changes and Actions due to Results:**

The MS program is graduating, on average, 5 students per year.

Although many of our students are graduates of the TTU BS in Mathematics program, some are from other institutions in the US and some are international students. In the upcoming academic year we plan to create a Graduate Student Handbook containing information that will be useful to incoming students. This should be particularly helpful to students new to TTU and also encourage outside students to apply to our program.

### **Link to Assessment:**

## **Goal 2. Students will participate in extracurricular activities**

### **Define Goal:**

Mathematics graduate students will participate in extracurricular activities related to mathematics. These activities will include participation in the departmental Graduate Seminar and Teaching Seminar, presenting research, and the opportunity to attend lectures by guest speakers.

### **Intended Outcomes / Objectives:**

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment-Goal 2: Count of the number of presentations by graduate students and guest speakers**

#### **Frequency of Assessment:**

annually

#### **Rationale:**

The number of presentations during the previous year by graduate students (in the Graduate Seminar and Teaching Seminar, at Student Research Day, or at a conference) is counted. A count of the number of presentations by guest speakers is also made.

Threshold of Acceptability: Each graduate assistant should actively participate in the Teaching Seminar and present at least 1 talk in the Graduate Seminar.

## **Learning Outcome 1. Students will demonstrate breadth of mathematical knowledge**

### **Define Goal:**

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

### **Intended Outcomes / Objectives:**

MS in Mathematics graduates will demonstrate knowledge of graduate-level Algebra and Analysis by earning grades of B or better in Math 6110-Abstract Algebra and a 6000-level course in Analysis (Math 6010-Functional Analysis, Math 6310-Complex Analysis, or Math 6410-Real Analysis).

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment of MS student breadth of knowledge**

#### **Frequency of Assessment:**

each semester as needed as students complete the degree program

#### **Rationale:**

A student's knowledge of Algebra and Analysis is assessed by course grades in Math 6110-Abstract Algebra and the required 6000-level course in Analysis (one of Math 6010-Functional Analysis, Math 6310-Complex Analysis, or Math 6410-Real Analysis) and the course grades in the year-long course sequences on the student's program of study.

Threshold of Acceptability: Students should earn a grade of B or better in all classes

RELATED ITEM LEVEL 2

### **Results: Learning Outcome 1-Breadth of Knowledge of Mathematics**

#### **Results:**

(number of graduate students) Each 2018-19 graduate demonstrated a breadth of knowledge of mathematics by completing Math 6110-Abstract Algebra and a 6000-level course in Analysis with a grade of B or better.

#### **Attachments:**

RELATED ITEM LEVEL 3

## **Modification- Learning Outcome 1- Student breadth of mathematics knowledge**

### **Program Changes and Actions due to Results:**

No changes necessary at this time.

### **Link to Assessment:**

All graduates earned grades of B or better in the 6000-level Analysis and Algebra courses on their programs of study. The mathematics graduate faculty are satisfied that students completing the MS in mathematics program are demonstrating knowledge of the basic algebra and analysis topics that all graduate students should understand.

## **Learning Outcome 2. Students will demonstrate in-depth knowledge of a selected area of mathematics**

### **Define Goal:**

### **Intended Outcomes / Objectives:**

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

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment of MS student depth of knowledge**

### **Frequency of Assessment:**

### **Rationale:**

Non-thesis students' depth of knowledge is assessed by comprehensive exams covering 2 of the 3 year-long course sequences such students are required to take. The exams are prepared and scored by the instructors of the course sequences.

Threshold of Acceptability: A passing score on both comprehensive exams.

Thesis students' depth of knowledge is assessed by their written thesis and their oral thesis defense.

Threshold of Acceptability: A majority of thesis committee members assess the student as having passed the thesis defense and demonstrated understanding of the material in the thesis.

## RELATED ITEM LEVEL 2

### **Results: Learning Outcome 2: Depth of Knowledge**

#### **Results:**

Each 2018-19 graduate completed a thesis and demonstrated a depth of knowledge by defending his/her thesis and having it approved by an advisory committee. The attached file contains the rubric used by thesis committees to assess student mastery of thesis topic and the oral exam portion of the thesis defense.

#### **Attachments:**

Master's Defense and Oral Exam rubric 2.pdf

## RELATED ITEM LEVEL 3

### **Modification: Learning Outcome 2: Depth of Knowledge**

#### **Program Changes and Actions due to Results:**

The Graduate Faculty will consider ways to improve the thesis defense rubric.

#### **Link to Assessment:**

The faculty believe our assessment rubric can be improved to better assess student performance in the thesis defense.