

## Mathematics BS: 2019-2020

### Definition of Unit

#### Providing Department:

Mathematics BS

#### Department/Unit Contact:

Michael Allen

#### Mission/Vision Statement:

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 – Maintain a Health Degree Program

#### Define Goal:

The Mathematics program will grow and continue to recruit and retain a strong number of students.

#### Intended Outcomes / Objectives:

The undergraduate degree program will average at least 10 graduates per year.

DRILL DOWN-----

RELATED ITEM LEVEL 1

#### **Assessment: Count Mathematics graduates in the previous July 1- June 30 time period**

#### Frequency of Assessment:

Annually

#### Rationale:

Each May the number of graduates earning the BS in Mathematics in the previous year is determined and trends are tracked using a 5-year average of the number of graduates

RELATED ITEM LEVEL 2

**Results- Goal 1 - Number of BS in Math Graduates**

**Results:**

The BS in Mathematics program achieved this goal by graduating 14 students in the 2019-2020 academic year. The table below shows the number of graduates per year. The average number of graduates for the last five years was 13.6. Hence, the department has met its goal of 10 graduates per year.

Number of TTU BS in Mathematics Graduates  
July 1-June 30 reporting periods

| Year      | Men | Women | Total Number of Graduates |
|-----------|-----|-------|---------------------------|
| 2006-2007 | 4   | 1     | 5                         |
| 2007-2008 | 4   | 2     | 6                         |
| 2008-2009 | 8   | 1     | 9                         |
| 2009-2010 | 6   | 2     | 8                         |
| 2010-2011 | 8   | 3     | 11                        |
| 2011-2012 | 6   | 2     | 8                         |
| 2012-2013 | 9   | 3     | 12                        |
| 2013-2014 | 12  | 8     | 20                        |
| 2014-2015 | 15  | 4     | 19                        |
| 2015-2016 | 9   | 4     | 13                        |
| 2016-2017 | 13  | 3     | 16                        |
| 2017-2018 | 8   | 5     | 13                        |
| 2018-2019 | 7   | 5     | 12                        |
| 2019-2020 | 11  | 3     | 14                        |

**Attachments:**

RELATED ITEM LEVEL 3

**Modification for Goal 1: Average at least 10 graduates per year**

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

The average number of graduates for the last five academic years will be 15.

**Link to Assessment:**

## **Goal 2 - Increase use of technology in mathematics classes**

### **Define Goal:**

Increase the use of technology in mathematics classes.

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

The number of faculty using technology and the type of technology used in the classroom will increase every year until the unit is saturated with users of technology.

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment: Faculty Annual Report**

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

Annually

#### **Rationale:**

As part of their annual effort report each faculty member lists the type of technology used and STEM Center activities

## **Goal 3 - Improve placement of incoming students**

### **Define Goal:**

Improve initial math course placement for incoming freshmen and transfer/international students by developing a placement procedure involving a mathematics test.

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

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment: Goal 3- Improving Math Placement**

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

yearly

#### **Rationale:**

Each year the department chair determines if a placement procedure is in place and whether it needs to be adjusted.

RELATED ITEM LEVEL 2

## **Results - Goal 3- Improving Placement of Incoming Students**

### **Results:**

We continue to use the ACT Math subscore as a placement tool for students having an ACT score. Students without an ACT score or those who wish to challenge a placement have taken the COMPASS test. However, the COMPASS test has been discontinued by the Educational Testing Service. ACCUPLACER is now being used.

### **Attachments:**

## **Goal 4 - Contribute to outreach activities**

### **Define Goal:**

Faculty will be involved in outreach activities to spread the appreciation and understanding of mathematics.

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

DRILL DOWN-----

RELATED ITEM LEVEL 1

## **Assessment: Faculty Annual Report**

### **Frequency of Assessment:**

Annually

### **Rationale:**

As part of their annual effort report each faculty member lists the type of technology used and STEM Center activities

## **Learning Outcome 1- Math major knowledge**

### **Define Goal:**

Tennessee Tech's BS in Mathematics graduates will have an average score on the ETS Major Field Test at or above the 60th percentile. The threshold of acceptability is the 50th percentile.

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

Tennessee Tech's BS in Mathematics graduates will have an average score on the ETS Major Field Test at or above the 60th percentile. The threshold of acceptability is the 50th percentile.

DRILL DOWN-----

RELATED ITEM LEVEL 1

### **Assessment: ETS Major Field Test**

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

each fall and spring semester

#### **Rationale:**

The ETS Major Field Test in Mathematics is designed to measure student performance so that meaningful comparisons between similar schools throughout the country can be made. All graduating mathematics majors are expected to take the Major Field Test during their final semester at TTU.

RELATED ITEM LEVEL 2

### **Results - Learning Outcome 1 - ETS Major Field Test scores**

#### **Results:**

Six of the nine students who took the ETS Major Field Test in Mathematics in 2019-20 scored at the 75th percentile or higher. Thus this learning outcome goal of having at least 50% of our students score at the 75th percentile or higher was met. In fact, four of the six students whose score was at least at the 75th percentile actually scored at the 90th percentile or higher.

The table below displays the average scores of TTU students who took the Major Field Test in Mathematics in recent academic years.

Average Scores on ETS Major Field Test in Mathematics

|                | National Average | Number of TTU Math Students Taking the Test | TTU Average | Percentile of TTU Average |
|----------------|------------------|---|-------------|---------------------------|
| <b>2007-08</b> | 155.5            | 4   | 165         | 85 <sup>th</sup>          |
| <b>2008-09</b> | 155.9            | 6   | 166.5       | 90 <sup>th</sup>          |
| <b>2009-10</b> | 156              | 5   | 163.6       | 80 <sup>th</sup>          |
| <b>2010-11</b> | 156              | 9   | 169         | 94 <sup>th</sup>          |
| <b>2011-12</b> | 156              | 8   | 171.6       | 96 <sup>th</sup>          |
| <b>2012-13</b> | 156              | 11  | 160.7       | 74 <sup>th</sup>          |
| <b>2013-14</b> | 156.4            | 19  | 161.2       | 67 <sup>th</sup>          |
| <b>2014-15</b> | 155.1            | 18  | 164.9       | 80 <sup>th</sup>          |
| <b>2015-16</b> | 155.0            | 10  | 174.5       | 97 <sup>th</sup>          |
| <b>2016-17</b> | 156.3            | 12  | 160.3       | 75 <sup>th</sup>          |
| <b>2017-18</b> | 157.3            | 12  | 172         | 93 <sup>rd</sup>          |
| <b>2018-19</b> | 156.2            | 12  | 172.8       | 93 <sup>rd</sup>          |
| <b>2019-20</b> | 157.4            | 9   | 177         | 84 <sup>th</sup>          |

**Attachments:**

## Learning Outcome 2 - Other majors able to use math appropriately

### Define Goal:

All students graduating from the University will be "mathematically literate" and able to apply their knowledge from the mathematics courses in their curricula.

### Intended Outcomes / Objectives:

DRILL DOWN-----

RELATED ITEM LEVEL 1

### Assessment: National Survey of Student Engagement

#### Frequency of Assessment:

Every 2 to 3 years

#### Rationale:

Relevant questions on the NSSE will assess students' confidence in their mathematical abilities

RELATED ITEM LEVEL 2

### Results for Learning Outcome 2: NSSE

#### Results:

Data from the 2011, 2014, 2017, and 2019 National Study of Student Engagement (NSSE) comparing the TTU average to the averages of all Tennessee public universities and our Carnegie peers on a question related to the learning outcome is shown in the table below. Freshman and senior students were asked to what extent their experience at college had contributed to their ability to analyze quantitative data.

TTU Student Response Averages on NSSE Questions Related to Ability to handle Quantitative Data

|                 | 2011<br>TTU | 2011<br>THEC | 2011<br>Carnegie | 2014<br>TTU | 2014<br>THEC | 2014<br>Carnegie | 2017<br>TTU | 2017<br>THEC | 2017<br>Carnegie | 2019<br>TTU | 2019<br>Quality<br>Assurance | 2019<br>Carnegie |
|-----------------|-------------|--------------|------------------|-------------|--------------|------------------|-------------|--------------|------------------|-------------|------------------------------|------------------|
| <b>Freshmen</b> | 2.99        | 2.97         | 2.98             | 2.4         | 2.4          | 2.3              | 2.7         | 2.7          | 2.6              | 3.1         | 2.9                          | 2.9              |
| <b>Seniors</b>  | 3.18        | 3.12         | 3.10             | 2.0         | 2.4          | 2.3              | 2.9         | 2.8          | 2.8              | 3.3         | 3.1                          | 3.2              |

Scale: 1= Very Little; 2= Some; 3= Quite a Bit; 4= Very Much

#### Attachments:

DRILL DOWN-----

RELATED ITEM LEVEL 1

**Assessment: Praxis II Math Content Knowledge**

**Frequency of Assessment:**

every semester

**Rationale:**

The Praxis Content Knowledge test in Mathematics is designed to assess the mathematical knowledge and competencies necessary for a beginning teacher of secondary school mathematics

RELATED ITEM LEVEL 2

**Results - Learning Outcome 2- Praxis II Math Subject Assessment Data**

**Results:**

The Praxis II Mathematics Subject Assessment data for TTU graduates is shown in the table below. All students who earned the degree in secondary education mathematics passed the exam because passing the exam is a degree requirement. However, in recent year some students required multiple test attempts to pass the exam. For 2020, the numbers indicate some have not taken the their final attempt yet.

Pass Rate of TTU Students on Praxis II Math Content Knowledge Test

| Academic Year                 | 2012-13     | 2013-14     | 2014-15     | 2015-16     | 2016-17     | 2017-18     | 2018-19     | 2019-20     |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Number of Test Takers         | 5           | 8           | 5           | 5           | 2           | 1           | 3           | 10          |
| First Attempt Pass Rate       | 4/5 or 80%  | 7/8 or 87%  | 2/5 or 40%  | 2/5 or 40%  | 1/2 or 50%  | 0/1 or 0%   | 0/3 or 0%   | 8/10 or 80% |
| Final Pass Rate for Licensure | 5/5 or 100% | 8/8 or 100% | 5/5 or 100% | 5/5 or 100% | 2/2 or 100% | 1/1 or 100% | 3/3 or 100% | 8/10 or 80% |

**Attachments:**

RELATED ITEM LEVEL 3



## **Modification for Learning Outcome 2**

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

The PRAXIS II test results indicate that Secondary Education Mathematics students are struggling to pass the math content test on their initial attempt.

In spring 2019 the department offered a Special Topics course based on a curriculum for future high school mathematics teachers developed by the Mathematics Teacher Education Partnership. We plan to create a new upper-division mathematics course for SEMA majors. The course will utilize portions of the curriculum developed by the partnership and materials developed by departmental faculty.

### **Link to Assessment:**