

## UNIT REPORT

**Mathematics BS - Final Annual Report**

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**Mission Statement of Math Department**

Start: 07/01/2017

End: 06/30/2018

Providing Department: Mathematics BS

Department/Unit Contact: Allan Mills

**Mission/Vision/Goal 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 - Average at least 10 graduates per year**

Progress: Ongoing

**Define Goal:**

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

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

Progress: Ongoing

**Define Goal:**

Increase the use of technology in mathematics classes.

**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.

**Goal 4 - Contribute to STEM Center mission**

Progress: Ongoing

**Define Goal:**

Contribute to the mission of the Center for Teaching and Learning in Science, Technology, Engineering, and Mathematics (STEM) by having faculty members involved in its activities.

**Learning Outcome 1- Math major knowledge**

Progress: Ongoing

**Define Goal:**

Students graduating in mathematics will demonstrate an understanding of mathematics by having 50% of graduates score at or above the 75th percentile on the ETS Major Field Test in Mathematics.

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

Progress: Ongoing

**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.

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

**Goal/ Outcome/ Objective:** Program Goal 1

**Type of Tool:** Graduation Rate

**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

**Assessment: ETS Major Field Test**

**Goal/ Outcome/ Objective:** Student Learning Outcome 1

**Type of Tool:** Exit Exam

**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.

**Assessment: Faculty Annual Report**

**Goal/ Outcome/ Objective:** Program Goals 2 and 4

**Type of Tool:** Survey

**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

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

**Goal/ Outcome/ Objective:** Goal 3

**Type of Tool:** Other

**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.

**Assessment: National Survey of Student Engagement**

**Goal/ Outcome/ Objective:** Student Learning Outcome 3

**Type of Tool:** Survey

**Frequency of Assessment:** Every 2 to 3 years

**Rationale:**

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

**Assessment: Praxis II Math Content Knowledge**

**Goal/ Outcome/ Objective:** Student Learning Outcome 2

**Type of Tool:** Certification Exam

**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

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

**Goal/Objective/Outcome Number:** Goal 3

**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.

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

**Goal/Objective/Outcome Number:** Learning Outcome 1

**Results:**

Six of the twelve students who took the ETS Major Field Test in Mathematics in 2016-17 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, each of the six students whose score was at least at the 75th percentile acutally 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
2007-08	155.5	4	165	85 <sup>th</sup>
2008-09	155.9	6	166.5	90 <sup>th</sup>
2009-10	156	5	163.6	80 <sup>th</sup>
2010-11	156	9	169	94 <sup>th</sup>
2011-12	156	8	171.6	96 <sup>th</sup>
2012-13	156	11	160.7	74 <sup>th</sup>
2013-14	156.4	19	161.2	67 <sup>th</sup>
2014-15	155.1	18	164.9	80 <sup>th</sup>
2015-16	155.0	10	174.5	97 <sup>th</sup>
2016-17	156.3	12	160.3	75 <sup>th</sup>
2017-18	157.3	12	172	unknown

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

**Goal/Objective/Outcome Number:** Learning Outcome 2

**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.

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
Number of Test Takers	5	8	5	5	2	1
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%
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%

**Results for Learning Outcome 2: NSSE**

**Goal/Objective/Outcome Number:** Learning Outcome 2

**Results:**

Data from the 2011, 2014, and 2017 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 TTU	2011 THEC	2011 Carnegie	2014 TTU	2014 THEC	2014 Carnegie	2017 TTU	2017 THEC	2017 Carnegie
<b>Freshmen</b>	2.99	2.97	2.98	2.4	2.4	2.3	2.7	2.7	2.6
<b>Seniors</b>	3.18	3.12	3.10	2.0	2.4	2.3	2.9	2.8	2.8

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

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

**Goal/Objective/Outcome Number:** Goal 1

**Results:**

The BS in Mathematics program achieved this goal by graduating 12 students in the 2017-2018 academic year. See the attached file for a table showing the number of graduates per year for the most recent 10 academic years.

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	4	12

**Results- Goal 2- Increase Use of Technology in Math Classes**

**Goal/Objective/Outcome Number:** Goal 2

**Results:**

The table below shows the number of sections taught by full-time mathematics faculty members in which instructional technology is used. Since many adjuncts, graduate assistants, and Learning Support mathematics faculty members incorporate instructional technology in their courses, the counts underreport the overall use of instructional technology in mathematics classes at TTU.

The data shows a steady increase in the use of instructional technology.

**Number of Sections Using Technology in Instruction**

	2012	2013	2014	2015	2016	2017
<b>Class Instruction</b>						
iLearn	44	25	60	70	80	85
Automated Homework	17	20	29	40	52	52

Table to project lectures	35	25	45	52	55	73
Archive lectures	10	13	9	35	40	46
<b>Software Use</b>						
Maple/Maxima/ Mathematica	7	0	3	2	2	0
Matlab	3	0	1	3	3	0
R	5	12	8	13	18	5
SAS	3	3	5	3	3	2
Excel	15	7	3	7	13	5
DPGraph	2	0	4	5	1	1

### **Results: Goal 4- Participate in STEM Center Activities**

**Goal/Objective/Outcome Number:** Goal 4

**Results:**

Three full-time faculty members reported participating in outreach activities, but only one of them worked through the STEM Center.

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

**Goal/Objective/Outcome Number:** Goal 1. Average at least 10 graduates per year

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

The department has had at least 10 graduates per year in recent years.

We'll retain this goal as it is important to meet the productivity threshold of at least 10 graduate per year.

No modification necessary at this time.

### **Modification for Goal 2: Increase use of technology in teaching**

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

Faculty are satisfied with their use of technology in teaching. No modification necessary at this time.

### **Modification for Goal 3: Improve Placement of incoming students**

**Goal/Objective/Outcome Number:** Goal 3

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

The current placement system seems to be effective at placing students in an appropriate mathematics class in a timely manner.

The departmental faculty will consider deleting this Goal at the beginning of the fall 2018 semester.

### **Modification for Learning Outcome 1**

**Goal/Objective/Outcome Number:** Learning Outcome 1

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

The mathematics faculty are satisfied with the scores of our students on the ETS Major Field Test. We will discuss modifying the goal so that it is focused on the performance of all of our students rather than the best of our students.

No modification necessary at this time.

## **Modification for Learning Outcome 2**

**Goal/Objective/Outcome Number:** Learning Outcome 2

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

The NSEE data indicate that students from a variety of majors believe they are improving their ability to work with numerical and statistical information at TTU. On the other hand the PRAXIS II test results indicate that Secondary Education Mathematics students are struggling to pass the math content test.

We investigated the PRAXIS pass rate issue with Dr. Holly Anthony from the Department of Curriculum and Instruction. As a first step, we compared the content of the mathematics courses in the SEMA curriculum to the topics and skills assessed on the PRAXIS. It turns out that a lot of the mathematics assessed on the PRAXIS is precalculus material that is not in the SEMA curriculum. In addition, the department offered a special topics course for SEMA majors in spring 2018 that was a review for the PRAXIS. Ten students enrolled and three students were successful in passing the PRAXIS late in the spring or early in the summer. In spring 2019 the department plans to offer a Special Topics course based on a curriculum for future highschool mathematics teachers developed by the Mathematics Teacher Education Partnership. Over the next two years we plan to utilize that curriculum or fold the best aspects of it in with materials developed by departmental faculty to create a new upper-division mathematics course for SEMA majors.

**Link to Flight Plan:** Improve Undergraduate Student Experience

## **Modification to Goal 4: Participate in STEM Center Activities**

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

A few faculty members participate in STEM Center activities. All faculty are aware of the potential to participate in STEM Center activities. Some faculty members are involved in outreach activities that do not involve the STEM Center.

We may consider revising this goal to broaden it to include all types of outreach and professional development activities rather than those affiliated with the STEM Center.