



Final Annual Report

Tennessee Tech University

President

Provost

College of Arts and Sciences

Mathematics

Mathematics BS



Mission Statement of Math Department

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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

Define Goal

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

Intended Outcomes / Objectives



Goal 2 - Increase use of technology in mathematics classes

Define Goal

Increase the use of technology in mathematics classes.

Intended Outcomes / Objectives



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

Goal 4 - Contribute to STEM Center mission

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.

Intended Outcomes / Objectives

Learning Outcome 1- Math major knowledge

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.

Intended Outcomes / Objectives


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




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

Goal/ Outcome/ Objective: Program Goal 1

Type of Tool: Graduation Rate

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 data for BS goal 1

Frequency of Assessment: Annually

 **Assessment: ETS Major Field Test**

Goal/ Outcome/ Objective: Student Learning Outcome 1

Type of Tool: Exit Exam

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.

Frequency of Assessment: each fall and spring semester

 **Assessment: Faculty Annual Report**

Goal/ Outcome/ Objective: Program Goals 2 and 4

Type of Tool: Survey

Rationale

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

Frequency of Assessment: Annually

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

Goal/ Outcome/ Objective: Goal 3

Type of Tool: Other

Rationale

Each year the department chair determines if a placement procedure is in place and



whether it needs to be adjusted.

Frequency of Assessment: yearly



Assessment: National Survey of Student Engagement

Goal/ Outcome/ Objective: Student Learning Outcome 3

Type of Tool: Survey

Rationale

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

Frequency of Assessment: Every 2 to 3 years



Assessment: Praxis II Math Content Knowledge

Goal/ Outcome/ Objective: Student Learning Outcome 2

Type of Tool: Certification Exam

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

Frequency of Assessment: every semester



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. We will use ACCUPLACER as a replacement in future academic years.

Attachments

No items to display.

**Results - Learning Outcome 1 - ETS Major Field Test scores****Goal/Objective/Outcome Number:** Learning Outcome 1**Results**

Five 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 was not met.

The average of our student's scores was at the 75th percentile of a ranked list of average student scores of all institutions using the exam. Four of our better graduates earned two degrees and did not take the Major Field Test in Mathematics. This might explain the decrease in average score from previous years.

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

Average Scores on ETS Major Field Test in Mathematics



National Average Number of TTU Math Students Taking the Test

2007-08	155.5	4	165	85 th
2008-09	155.9	6	166.5	90 th
2009-10	156	5	163.6	80 th
2010-11	156	9	169	94 th
2011-12	156	8	171.6	96 th
2012-13	156	11	160.7	74 th
2013-14	156.4	19	161.2	67 th
2014-15	155.1	18	164.9	80 th
2015-16	155.0	10	174.5	97 th
2016-17	156.3	12	160.3	75 th

Attachments

No items to display.


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	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Number of Test Takers	5	8	5	5	2
First Attempt Pass Rate	4/5 or 80%	7/8 or 87%	2/5 or 40%	2/5 or 40%	1/2 or 50%
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%

Attachments

No items to display.



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 has contributed to their ability to analyze quantitative data.

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

	2011 TTU	2011 THEC	2011 Carnegie	2014 TTU	2014 THEC	2014 Carnegie	2017 TTU	2017 THEC	2017 Carnegie
Freshmen	2.99	2.97	2.98	2.4	2.4	2.3	2.7	2.7	2.7
Seniors	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



Attachments

No items to display.



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 16 students in the 2016-2017 academic year. See the attached file for a table showing the number of graduates per year for the most recent 10 academic years.

Attachments

 Table of BS Graduate Statistics



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

Goal/Objective/Outcome Number: Goal 2

Results

The table in the attached file 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.

Attachments

 Technology Use in Instruction



Results: Goal 4- Participate in STEM Center Activities

Goal/Objective/Outcome Number: Goal 4

Results

Six full-time faculty members reported participating in STEM Center activities. Four



faculty members were involved in the NSF STEP grant "Math Success for STEM Majors." Two other faculty members were involved with grants to provide content knowledge in summer workshops for K-12 teachers. Four additional faculty members and a graduate student participated in a Bridge to Calculus II workshop offered by the department in January 2016.

Attachments

No items to display.



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.

Link to Assessment

Link to Flight Plan:



Modification for Goal 2: Increase use of technology in teaching

Goal/Objective/Outcome Number:

Program Changes and Actions due to Results

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

Link to Assessment

Link to Flight Plan:



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 2017 semester.

Link to Assessment

Link to Flight Plan:



Modification for Learning Outcome 1

Goal/Objective/Outcome Number: Learning Outcome 1

Program Changes and Actions due to Results

Although this learning outcome was not met in 2016-17, the mathematics faculty are satisfied with the scores of our students on the ETS Major Field Test. In particular, the average score obtained by our 2016-17 graduates was lower than in previous years in part because 4 of our better students were double majors and did not take the Major Field Test for Mathematics.

No modification necessary at this time.

Link to Assessment

Link to Flight Plan:



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 plan to investigate this 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. We plan to offer a series of study sessions or even a class in which SEMA majors can prepare for the PRAXIS.

Link to Assessment

Link to Flight Plan:



Modification to Goal 4: Participate in STEM Center Activities

Goal/Objective/Outcome Number:

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.

Link to Assessment

Link to Flight Plan: