



Tennessee Tech University

Final Annual Report

Tennessee Tech University

President

Provost

College of Arts and Sciences

Mathematics

Mathematics BS



Mission Statement of Math Department
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

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



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 **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



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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



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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



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Results

We continue to utilize the ACT Math subscore as a placement tool for students having an ACT score. Students who do not have an ACT score or those who wish to challenge a placement based on the ACT can take the COMPASS test and are placed using a concordance between the COMPASS and ACT.

The SAT began a new scoring system in spring 2016 so the department had to determine equivalencies between the new SAT scores and the current ACT score prerequisites in place for some entry-level mathematics classes.

Attachments

No items to display.



Results - Learning Outcome 1 - ETS Major Field Test scores

Goal/Objective/Outcome Number: Learning Outcome 1

Results

Four of the ten students who took the ETS Major Field Test in Mathematics scored at the 75th percentile or higher. Thus this learning outcome goal was not met.

However, nine of the ten students taking the exam scored at the 55th percentile or higher. In fact, three students obtained the highest score possible and the average of our student's scores was at the 97th percentile of a ranked list of average student scores of all institutions using the exam.

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



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National Average Number of TTU Math Students Taking the Test

Year	National Average	TTU Average	Percentile
2007-08	155.5	4	165
2008-09	155.9	6	166.5
2009-10	156	5	163.6
2010-11	156	9	169
2011-12	156	8	171.6
2012-13	156	11	160.7
2013-14	156.4	19	161.2
2014-15	155.1	18	164.9
2015-16	155.0	10	174.5

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 completed the secondary education program passed the exam, but some students required multiple test attempts.

One of the students in the 2015-16 cohort who did not pass on his first attempt was a transitional license student and did not take many mathematics classes at TTU.



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

Academic Year	2012 - 2013	2013 - 2014	2014-2015	2015-2016
Number of Test Takers	5	8	5	5
First Attempt Pass Rate	4/5 or 80%	7/8 or 87.5%	2/5 or 40%	2/5 or 40%
Final Pass Rate for Licensure	5/5 or 100%	8/8 or 100%	5/5 or 100%	5/5 or 100%

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 13 students in the 2015-2016 academic year. See the attached file for a table showing the number of graduates per year for the most recent 10 academic years.

Attachments

 Assessment data for BS goal 1



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

Goal/Objective/Outcome Number: Goal 2



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Results

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

Number of Course Sections Taught by Full-Time Faculty Using Instructional Technology

	2012	2013	2014	2015
Class Instruction				
iLearn	44	25	60	70
Automated Homework	17	20	29	40
tablet to project lectures	35	25	45	52
Archive lectures	10	13	9	35
Required software for student use				
Maple/Maxima/Mathematica	7	0	3	2
Matlab	3	0	1	3
R	5	12	8	13
SAS	3	3	5	3
Excel	15	7	3	7
DPGraph	2	0	4	5

Attachments

No items to display.



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



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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.



Results: NSSE

Goal/Objective/Outcome Number: Learning Outcome 2

Results

Data from the 2011 and 2014 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
Freshmen	2.99	2.97	2.98	2.4	2.4	2.3
Seniors	3.18	3.12	3.10	2.0	2.4	2.3

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

Attachments

No items to display.