Physics BS

College of Arts & Science – Department of Physics

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The mission statement for the TTU Department of Physics is to promote the learning of physics 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.

The department addresses this mission through two programs:

1. a coherent program of study leading to a B.S. in Physics, and
2. a service program that provides courses in physics and astronomy that are requirements for other degree programs or are used by students to fulfill general education science requirements.

PG 1: The Department will recruit and retain sufficient majors for a thriving educational program.

Increase majors at least one per year. Having sustained an average of at least 30 majors for several years, the current minimum acceptable threshold is that the average number of majors should not drop below 30.

PG 2: The Physics Department will contribute to the mission of the Millard Oakley Center for Teaching and Learning in Science, Technology, Engineering, and Mathematics (STEM).

The majority of faculty in the department will support the center by teaching at least one class

PG 4: Provide opportunities for all physics majors to gain experience in authentic basic or applied research.

All faculty engaged in research in suitable fields will seek support to engage interested physics majors in their work. Opportunities at other institutions and in other fields will also be made known to physics majors. The targeted outcome is that all physics majors will have the opportunity to engage in such opportunities as many times as they wish during their TTU career. At a minimum, any interested student should engage in at least one such opportunity.

SLO 1: Students completing calculus-based and algebra-based introductory physics courses will demonstrate increased understanding of foundational basic concepts in mechanics.

Students will achieve an average normalized gain score of at least 45% on a standard diagnostic test. For many years the targeted goal was a gain of 40%, but with recent improved performance, this year the target was raised to 45%. Currently, the minimum acceptable performance for any particular class section is a 30% gain, and any gain greater than 50% is regarded as exemplary.

SLO 2: Students graduating in physics will demonstrate an understanding of the basic principles and foundations of physics.

Graduating seniors will score, on average, at or above the 75$^{th}$ percentile on the ETS Major Feld Test in Physics. The threshold of acceptability is to have all seniors score at or abov7oe, to18l.9 ( )forcel at h oo-6

SLO 5: Students graduating in physics will have received an introduction to a range of common technological tools appropriate to physics and related disciplines.

All graduating physics majors and alumni report being adequately prepared to use technological tools appropriate to physics and related disciplines in their employment or graduate studies.

SLO 6: The TTU physics program will give students sufficient preparation in content and skills/techniques to continue to graduate school or obtain suitable employment.

All graduating seniors and alumni will report being well prepared to continue on to graduate school in physics (or a closely related discipline) ( p)2.3 (o)-.9 (o)-6.6 ( c)8.6 (c)-2 (n)2.3 (t)-3 ( )10 (n)2.r3.3/P ≠MC

at other institutions. (Note: since almost all such experiences must necessarily take place during the summer it is impossible to ensure that all students will take advantage of such

*SLO 3: Students graduating in physics will demonstrate the skills and techniques necessary to engage in authentic experimental investigation.*

*PHYS 4710/4711 Capstone Course:* All physics majors take a senior lab course, either PHYS 4710

have a fresher recollection of their TTU experiences and so can provide valuable feedback on some elements of the program. The department chair already conducts a confidential exit interview with each graduating physics major. These interviews explicitly address how well prepared each student feels for their next career step, including their preparation in the use of technologica

*Fig 1. Number of students declaring a physics major at the start of each academic year.*

One development of note is the number of incoming freshmen who have cited the astronomy-related opportunities we have recently started offering as playing a part in their decision to come to Tennessee Tech.

*PG 2: The Physics Department will contribute to the mission of the Millard Oakley Center for Teaching and Learning in Science, Technology, Engineering, and Mathematics (STEM).*

With the Department's move back from Foundation Hall this year, it is now much more practical (and convenient) to teach all our classes in the refurbished Bruner Hall. Hence, no PHYS or ASTR courses were

- Reading quizzes and group-

*SLO 1: Student Learning Outcome 1 - Students completing calculus-based and algebra-based*

*SLO 2: Student Learning Outcome 2 - Students graduating in physics will demonstrate an understanding of the basic principles and foundations of physics.*

Major Field Test: Three graduating seniors took the Major Field Test this year, placing (on average) at the 61st percentile. This is a better result than last year, easily exceeding our minimum acceptable target of the 50th percentile, but still falls below our aspirational target of the 75th percentile. However, these students' junior and senior years were severely affected by the pandemic situation, whereas the percentile rankings are determined using several years of national data. This puts our three-year average percentile ranking at 63, but we will wait to propose any action until we see if the current downward trend continues as circumstances return to normal.

*Fig 4. Rolling 3-year average of physics majors' Major Field Test percentiles.*

Alumni Survey: A full report of our most recent survey in Fall 2019 is attached, but significant results in the context of this SLO are:

- Alumni continue to be highly satisfied with the program and the overall level of preparation they

*SLO 3: Student Learning Outcome 3 - Students graduating in physics will demonstrate the skills and techniques necessary to engage in authentic experimental investigation.*

For Learning Outcomes 3 (Experimental Skills) and 7 (Research Skills), the department has discussed what skills are important for student

*Support for core goals and learning outcomes in the program of study for a B.S. in Physics.*

Goals/Learning Outcomes