Department of Physics Mission Statement

The mission of the Department is to provide quality undergraduate education, quality graduate education, and quality physics and astronomy service courses for other departments at Texas Tech University, to produce high quality research, and to provide an environment where research and creativity in physics can flourish.

Department of Physics Vision Statement

The Department of Physics aspires to the highest standards of excellence in all aspects of teaching, research, and service. Teaching of physics courses to science majors, engineering majors and non-science majors will be of the highest quality. Research conducted by the Department’s faculty and students will be of importance nationally and internationally. Opportunities to render service to the University, to the surrounding community, and to the nation will be pursued.

Department of Physics Core Values

- Dissemination of knowledge of physics
- Thoroughness and integrity in research
- Development of new science through research

Scope of Department of Physics Programs

The Department of Physics is organized within the College of Arts and Sciences at Texas Tech University and is the home department for two undergraduate majors; Physics, and Engineering Physics which is administered by the College of Engineering. The Department maintains traditional research-based graduate programs in Physics at the MS and PhD levels and in Applied Physics at the MS level, and was at the forefront of a national drive toward “Professional Science Masters” programs when it initiated an industrial internship-based Applied Physics MS option in 1996, which remains one of the few successful PSM programs in physics nationally.
DEPARTMENT OF PHYSICS STRATEGIC PRIORITIES AND GOALS

INVEST IN THE PHYSICS DEPARTMENT

Student Access and Diversity: Recruit, retain, and graduate an increased number of better prepared and more diverse majors in Physics and Engineering Physics.

Faculty Quality: Increase resources to recruit and retain high quality physics faculty, expand in research areas targeted by the department, and enable innovative physics education.

Resources and Infrastructure: Recruit and retain quality staff; enhance the departmental infrastructure to support an optimal educational, research, and work environment.

ENRICH THE EDUCATIONAL EXPERIENCE

Undergraduate Teaching and Learning: Provide the highest quality of instruction for our undergraduate Physics and Engineering Physics majors, and for related programs and service courses; increase and enhance active learning opportunities outside the classroom.

Graduate and Professional Education: Maintain the highest quality of instruction and research training for graduate students; expand and enhance applied and professional degree options; contribute to advances in science education.

Engagement: Provide outreach opportunities that enhance student learning and contribute to the scientific exchange throughout the community.

ADVANCE RESEARCH AND CREATIVE ENDEAVORS

Research Productivity: Maintain a high quality of research; enhance productivity; increase scientific output and funding for basic and applied research.

Research Experience and Training: Provide a high quality research experience for graduate students, undergraduate majors, and post doctoral fellows.

Innovative Educational Initiatives: Support development of non-traditional programs and increase the effectiveness of physics and general science education at all levels.

STRENGTHEN PARTNERSHIPS

Interdisciplinary Research and Education: Maintain the existing collaborative programs, support interdisciplinary centers for research and education, and develop new collaborations between Physics and other departments at TTU and TTUHSC.

Collaborative Research: Maintain, support, and expand involvement of physics faculty and students in regional, national, and international collaborations.

Broader Partnerships: Collaborate in alliances with other academic, government, community, corporate, and private entities; involve alumni in the physics enterprise.

Benchmarks and Strategies for Physics Priorities and Goals
Priority: Invest in the Physics Department

Goal: Student Access and Diversity

Benchmarks

- Increase total number of majors and minors by 25% by 2012
- Expand our graduate programs

Strategies

- Maintain and improve contacts with high school physics teachers
- Improve program advertisement and distribution of recruitment materials
- Mentor incoming students to improve retention rates
  - Place majors in one section for introductory courses
  - Improve student success in key courses (1408, 2401, 2402, 3305, 3306, 4307)
- Track under-represented groups to ensure equal access and success
- Improve student satisfaction with courses and overall program
  - Develop and use student surveys on course and program effectiveness
  - Modify practices consistent with survey results and departmental priorities
- Improve student advisement and course scheduling to reduce mean time to degree
- Obtain increased funding for scholarships and assistantships

Goal: Faculty Quality

Benchmarks

- Develop consensus on future research areas: Adopt a long-term plan
- Increase recognition of faculty for teaching and research

Strategies

- Work with the university to
  - Plan for 4-5 replacement faculty positions; timing of retirements / replacements
  - Secure the related startup funds
- Mentor new faculty
- Increase faculty nominations for teaching and research awards

Goal: Enhance Departmental Resources and Infrastructure

Benchmarks

- Increase funds to targeted infrastructure enhancement
- Improve research, office, and teaching space

Strategies

- Fund critical infrastructure areas
  - Minimum of $20k / yr to IT at departmental level
  - Obtain $50k / yr to properly equip teaching labs for majors
  - Put $50k into electronics shop over 2-3 year period
- Seek outside funding support for targeted areas
Include infrastructure support in grant budgets where possible

Priority: Enrich the Educational Experience

Goal: Improve Undergraduate Teaching and Learning

Benchmarks
Increase fraction of students who master crucial concepts in key courses
Increase opportunities for undergraduate research
Develop new minors or professional tracks

Strategies
Mentor new faculty in teaching
Improve program effectiveness and student satisfaction
   Develop evaluation instruments to measure crucial concept mastery
   Develop and implement program effectiveness evaluation procedures
Modify expectations and evaluation procedures for research and senior projects
   Develop opportunities for student research presentations
Explore interdisciplinary educational linkages

Goal: Enhance Graduate and Professional Education

Benchmarks
Increase the numbers and quality of students in graduate programs
Decrease time to degree averages for traditional MS and PhD programs
Diversify the Applied Physics and “Professional Science Masters” programs

Strategies
Design and distribute new recruitment materials
Improve, maintain and regularly update the departmental web site
Review and expand agreements with primarily undergraduate institutions
Develop and implement program effectiveness evaluation procedures
Actively monitor student performance and progress in each program

Goal: Engagement and Outreach

Benchmarks
Increase interactions with area schools and programs for EC-12 teachers
Increase participation in science related activities for the community

Strategies
Provide incentives for faculty to become involved in the community
Give extra credit in courses for student involvement in targeted projects
Encourage faculty and student involvement with area schools

Priority: Advance Research and Creative Endeavors
Goal: Improve Research Productivity

**Benchmarks**
- Maintain the number and quality of publications
- Increase research funding
- Increase numbers and level of conferences attended

**Strategies**
- Continue emphasis on proposal writing
- Provide appropriate research infrastructure and support services
- Obtain funds for research equipment
- Obtain support for conference travel
- Obtain support for visits to granting agencies to explore opportunities

Goal: Enhance Research Experience and Training

**Benchmarks**
- Increase numbers of RAs
- Increase student publication and presentation numbers and quality
- Increase fraction of undergraduate majors engaged in research projects

**Strategies**
- Encourage faculty to sponsor undergraduate research and senior projects
- Develop criteria for quality control on UG Research Reports and Senior Theses
- Place departmental emphasis on support of graduate student travel to conferences
- Create departmental awards for student research activities

Goal: Innovative Educational Initiatives

**Benchmarks**
- Increase funding for education related projects
- Increase faculty and student involvement in exploring teaching methods
- Expand the “Professional Science Masters” program

**Strategies**
- Treat innovation in physics / science education as research equivalent
- Provide release time to pursue innovative approaches to teaching
- Encourage faculty involvement in teacher training projects

Priority: Strengthen Partnerships

Goal: Interdisciplinary Research and Education

**Benchmarks**
Increase physics involvement in interdisciplinary research
Participate in development of interdisciplinary education projects
Increase physics related funding for interdisciplinary projects

**Strategies**

Work with the university to
  - Provide more incentives to create or join interdisciplinary projects
  - Reward faculty and departments for success of interdisciplinary projects
  - Define the distribution of credit between centers and departments
  - Provide release time for faculty work with centers or other large projects
  - Credit significant education projects on even footing with research projects

**Goal: Collaborative Research**

**Benchmarks**

Continue and expand existing collaborations with groups outside TTU
Increase the numbers of projects and output from collaborative research

**Strategies**

Provide incentives to faculty to initiate new collaborations outside TTU
Facilitate visits of collaborators to TTU
Seek funds from university and outside sources to support visitors

**Goal: Broader Partnerships**

**Benchmarks**

Strengthen alumni relations and generate support for physics
Increase and improve interactions with local and regional school districts
Continue workshops for Teachers

**Strategies**

Engage the alumni in supporting physics at TTU
Provide appropriate credit to faculty for interactions with area schools
Explore formal interactions with local and regional school districts
Continue to sponsor workshops for EC-12 teachers