Strategic Plan, 2006
Department of Physics
Texas Tech University

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