Engineering Physics

The Engineering Physics program at Tarleton State University is one of only two ABET accredited programs in Texas and the largest. The program is an interdisciplinary engineering program that includes course work in electrical and computer engineering, material science, and physics. The program was developed in cooperation with industrial advisors to prepare graduates for either immediate employment as an engineer at the BS level or for graduate study in either physics or engineering. Past graduates have found employment as systems, mechanical, and electrical engineers at a wide variety of companies in Texas including Lockheed, Vought Aircraft, Halliburton, and Lumina. Other graduates have chosen to attend graduate school in Electrical Engineering, Biomedical Engineering, Computer Engineering, and Physics at MIT, Stanford, Rice and other fine institutions. Tarleton has recently setup a grid computing system and obtained a large microwave anechoic chamber from Lockheed Martin providing additional undergraduate research opportunities for engineering physics students.

Physics

Tarleton has one of the best equipped and most active undergraduate physics programs in the State of Texas with Tarleton hosting or co-hosting three State meetings since 2003. The physics program provides several different tracks that allow students to tailor the degree to their interests including: 1) Nuclear Track – for students interested in advanced study in nuclear engineering or employment in the nuclear power industry; 2) Medical Physics – to prepare students for advanced study in medicine, dentistry, or medical physics; 3) Astronomy track; 4) Dual 8-12 Secondary Math/Physics Teaching Certification; 5) Dual 8-12 Secondary Chemistry/Physics Teaching Certification and 6) Classical Track – for students wishing to obtain a second BS degree in Math, Computer Science, or Chemistry. Tarleton’s physics research facilities provide students with the chance to be involved in state of the art research that enhances the degree. Research facilities include one of only 6 undergraduate tandem accelerator facilities in the U.S., largest undergraduate robotic telescope facility in the U.S., and a state of the art JEOL electron microscope with 35 angstrom resolution. These facilities give Tarleton students an advantage in national competitions and admission into select graduate programs. During the past few years, TSU students have obtained summer research appointments to LIGO/CALTECH, CAMD, NASA, DoD Labs, and other facilities while Tarleton physics graduates have gone on to advanced study in medicine, physics, or engineering at Princeton, Duke, UT, A&M, and other institutions.

Environmental Engineering & Hydrology

Environmental engineering originally developed as a graduate specialization out of either mechanical or civil engineering while hydrology/Water Resource Engineering also developed as a graduate specialization in civil engineering. Water is a scarce resource in Texas and throughout the U.S. For the past thirty years, Tarleton State
University’s Hydrology program has been the only undergraduate program in Texas and one of only six in the country. Tarleton’s hydrology students have obtained paid summer internships across the U.S. as well as China while program graduates have found employment with government agencies including river authorities and municipalities as well as with industrial partners.

Tarleton also offers one of only two ABET accredited undergraduate environmental engineering programs in Texas and one of only six undergraduate hydrology programs in the U.S. Environmental engineers deal with a wide range of environmental issues including radioactive waste, solid waste, waste water treatment, water quality, and air pollution. A recent study commissioned by the Deans of Texas Engineering Colleges projects that environmental engineering will be among the fastest growing fields of employment over the next quarter century.

**Nuclear Engineering Courses**

Engineering and physics students have access to both traditional undergraduate nuclear engineering courses as well as the new nuclear engineering certificate courses from Texas A&M’s Nuclear Engineering Department through Tarleton’s association with NPI and the Texas Electronic Coalition for Physics (TECP). These courses can be used by engineering students to either fulfill the three advanced technical electives in the engineering physics degree or as additional course work to enhance the student’s engineering degree. Physics majors can use these courses to fulfill part of the student’s 26 hour support field or as part of the Physics with Nuclear Track Option.

**Tarleton State University**

Tarleton State University is the 2nd oldest member of the Texas A&M University System and is located in Stephenville, Texas about 60 miles southwest of the Dallas/Fort Worth Metroplex which is both a major area for aerospace development and the largest producer of semiconductor electronics in the U.S. Tarleton is also 30 miles southwest of Comanche Peak Nuclear Power Plant which presently has two operating reactors and the proposed site of two new ones.

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www.tarleton.edu/engrphys
Special Opportunities for Physics Majors

The Tarleton physics program offers students several special opportunities many of which are not available to students at other institutions.

BS Degrees in Physics & Engineering Physics

A Tarleton physics major with an engineering support field can through careful selection of courses and an additional 8 hours of course work obtain a second degree in Engineering Physics. Tarleton and Texas Tech have the only ABET accredited engineering physics degrees in Texas!!

BS Degrees in Physics & Computer Science or Math

Tarleton physics major with a support field in either Math or Computer Science can also earn a second BS degree in their support field by adding 9 hours of additional course work in their support area.

Nuclear Engineering

Tarleton physics majors can add up to 26 hours of nuclear engineering course work as their support field either in courses directed for graduate study in nuclear engineering or nuclear reactor operator certificate courses. These courses along with 15 hours of existing physics course work that correspond to material in undergraduate nuclear engineering enable a TSU physics major to enter A&M’s nuclear engineering graduate program with no leveling required. In fall 2009, Tarleton had the 2nd most students in nuclear engineering courses behind Texas A&M University of any institution in either the Big XII or TECP coalitions.

The Texas A&M System Quantum Summer & Winter Schools

Tarleton is a participant in the Texas A&M Quantum Institute and a major player in the undergraduate portion of this program. The institute brings together outstanding scientists and engineers in the fields of Quantum Electronics and Quantum Optics and its application to physics, engineering, and biology. The institute was founded by Dr. Marlan Scully who holds joint appointments at Princeton and Texas A&M and is a pioneer in quantum optics and widely referred as “the Quantum Cowboy.” The institute runs a two week winter school at a major ski resort and a two week summer school in Wyoming that are preceded by a two week school at Texas A&M. During this period, upper level physics majors and graduate students from Tarleton, Texas A&M, Princeton, Harvard, Rice, and other Quantum Institute sponsors have the chance to obtain instruction from world class researchers including two Nobel Prize winners as well as enjoy skiing and other entertainment activities. The schools are co-hosted by Dr. Marlan Scully of A&M who oversees the graduate and postgraduate activities and Dr. Daniel Marble of Tarleton State University who oversees the undergraduate activities.
Astronomy

In addition to having a physics degree with astronomy track, Tarleton offers students unique research opportunities. Most undergraduate physics programs either have no telescope like Abilene Christian or have a small non-research capable telescope like Angelo State or Trinity. The Tarleton observatory is not only the largest telescope in the entire Texas A&M System, but also the largest telescope at any university in the country without a graduate program. It is also a superior research grade telescope to those available at many universities with graduate programs including Texas Tech, University of North Texas, University of Texas at Arlington, University of Oklahoma, etc. Furthermore, since it is completely robotic, Tarleton students can control the telescope from the campus control room, the observatory, or even acquire data using the web. This provides Tarleton astronomy students with a chance to get involved in doing astronomy research starting their freshman year.

Medical Physics

The application of physics to medicine is a rapidly expanding field from the development of new devices in the field of bioengineering to the application of nuclear and accelerator physics to image and treat cancers. Tarleton’s unique medical physics program provides hands on experience in accelerator and vacuum technology, courses in medical physics including ionizing radiation & magnetic resonance imaging, as well as a strong pre-medical curriculum. This provides the student with the chance to acquire the background necessary to pursue advanced degrees in bioengineering, medical physics, medicine, or dentistry. For instance, a recent graduate is pursuing a PhD in Bioengineering at Rice and a second is doing a PhD in Health Physics at Texas A&M.

Wide Range of Course Offerings

Although Tarleton’s physics program offers one on one instruction of a select undergraduate program, we also offer a greater variety of undergraduate courses than most graduate research institutions. Just look at the list of elective and upper level physics and nuclear engineering courses we are either offering this fall or recently:

1) Intermediate Mechanics  2) Electromagnetism  3) Thermodynamics  
7) Optics  8) Nuclear Physics  9) General Relativity/Cosmology  
10) Quantum Mechanics  11) Stellar Astronomy  12) Planetary Astronomy  
13) Optical Communications  14) Microwave Theory  15) Computational Physics  

Scholarships

Tarleton offers a wide range of academic scholarships ranging including the $9,000 a year Dick Smith Premie, $7,000 Presidential Honors as well as Engineering and Physics Departmental scholarships of up to $4,000 a year. Given the high academic quality of Tarleton Physics students, almost all physics majors either came to Tarleton on scholarship or obtained one by their sophomore year. Our SAT’s are several points higher than the university average, but what is most important is not your present background but how much you want to succeed. We recruit dedicated students who want to succeed and provide them with quality instruction in small classrooms. If a student doesn’t want to work hard on their course work then Tarleton’s Physics program is not the place to be!!
**Application:**

You can be sure that you are considered for a physics scholarship at Tarleton by selecting Tarleton as one of the schools on your Texas common application form and by submitting a Tarleton Scholarship application. The sooner that you get your admission and scholarship applications into the university, the more likely your chance of getting a scholarship.

**Student Success**

Our students have excelled at the national level both in admission to elite graduate programs and in national scholarship and research competitions.

**Partial Alumni List**

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<thead>
<tr>
<th>Engineering, Rice</th>
<th>Physics, Rice</th>
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<tbody>
<tr>
<td>Joseph Gilbert</td>
<td>Wayne Keith</td>
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<td>David Bixler</td>
<td>Kevin Wollard</td>
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<td>Stephen Myers</td>
<td>J’Nae Zwaschka</td>
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<td>Chance Mooney</td>
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<td>Jacob Swartz</td>
<td>Evan Stenmark</td>
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<td>Ben Urban</td>
<td>James Konvicka</td>
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<td>James Gary</td>
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**Undergraduate Competitions (Partial List)**

- CALTECH LIGO – Anthony Raymond 2009
- CALTECH MURF – Jose Pacheco 2008