PHYSICS (ENGINEERING-PHYSICS CONCENTRATION), BACHELOR OF SCIENCE

As the Texas top ranked program in undergraduate Physics degrees awarded to African-Americans, the Department of Physics in the College of Science, Engineering and Technology, offers the Bachelor of Science (B.S.) Degree in Physics in two concentrations: (1) Engineering Physics and (2) Premedical Physics. Both of these concentrations require 42 credit hours in core classes, 40 credit hours in foundational mathematics and physics classes including two Advanced Physics Elective courses. In addition, the Engineering Physics concentration collectively requires up to 17 credit hours in Engineering and Computer Science Elective classes, respectively while the Premedical Physics concentration requires 31 credit hours in Chemistry, Biology and Psychology.

Of note, the B.S. Degree in Physics is offered through the Texas Physics Consortium (TPC), administered by the Texas A&M University System, under a mutual agreement among several other Physics programs within Texas. This unique program offers a Diploma that bears the seal of the Texas A&M University System, in addition to the seal of Texas Southern University, and the other participating campuses that comprise TPC: Prairie View A&M University, Tarleton State University, Texas A &M Kingsville, Texas A & M Corpus Christi, Midwestern State University, and West Texas A& M University. TSU Physics students benefit from the diverse collective expertise of faculty at these institutions through synchronous on-line Physics classes for junior and senior students.

The goal of the undergraduate Physics program is to help students develop learning skills, problem solving techniques and professional ethics and attitudes that will support their further academic work or future employment in their technical or biomedical career of choice, through the study of physics. Of note, students interested in pharmacy would also benefit greatly in the physics premed concentration. It's not just rocket science: physics is the route to so many careers, from predicting climate change to designing computer games. Find out where physics can take you. It is no coincidence that physics graduates earn the highest scores in professional admission tests such as the MCAT, LSAT or PE. Hence, the graduate with a Physics degree will exhibit understanding of advanced physical concepts, mathematical and analytical skills, and also utilize technology to develop models for solving problems and analyzing new situations.

The Department of Physics is located on the second floor of the Leonard H. O. Spearman Technology Building and has significant resources on site to assist students and ensure their success. Besides teaching Physics laboratories, the faculty in the Department of Physics conducts research and manages well-equipped Radiation Health Physics, Radio Astronomy, High Performance Computing, and Mathematical Physics laboratories. Physics tutoring and MCAT preparation workshops are routinely offered in a dedicated room.

Students wishing to pursue the B.S. degree in Physics are required to contact the Department of Physics about their intentions and declare a minor or a major in a second academic discipline. All courses completed that are designated for the minor selected must be completed with grades of "C" or better, where grades of "C-" are unacceptable. This grade requirement is more stringent for students interested in teaching physics. The same rule applies to students in other disciplines seeking the minor in Physics. Students wishing to pursue either a major (B.S.) or minor in Physics must first be admitted to the University, must satisfy TSI Assessment requirements, must eradicate deficiencies assessed at the time of admission through the University Testing Center, and must petition the Department for admission as TSI Assessment requirements or equivalent are completed. Once admitted to the program, students are assigned an official faculty advisor who must be consulted on a semester basis for schedule approval and status verification for progress toward graduation. An exit examination is required of all graduating seniors pursuing the B.S. in Physics.

The Department of Physics at TSU has also offered a dedicated health physics program funded by the U.S. Nuclear Regulatory Commission. This program originally began in the fall of 2008 and was the only undergraduate health physics/radiation physics program in Houston. In addition to radiation physics theory and safety fundamentals, students learned basic, technical experiments in the health physics laboratory designed for graduate students. The health physics course sequence coupled with the degree plan is being updated and will include: Atomic and Radiation Physics; Environmental Radioactivity Seminar; Radiation Detection I; Radiation Detection II; Radiation Protection and Dosimetry.

The Department of Physics strongly encourages students to seek certification for Teaching Physics or Sciences in the public schools of Texas. The Teacher Certification Officer in the College of Education along with a TSU physics faculty member can further guide and advise students wishing to pursue this opportunity.

The minor in Physics requires 19 semester credit hours for the following courses:

- University Physics I (PHYS 251) and University Physics I Laboratory (PHYS 217)
- University Physics II (PHYS 252) and University Physics II Laboratory (PHYS 218)
- Modern Physics (PHYS 332)
- Electricity and Magnetism (PHYS 333) OR Thermodynamics and Statistical Physics (PHYS 336)
- Mechanics (PHYS 341)
- Physics Senior Thesis I and II sequence (PHYS 415 and PHYS 416) OR any 400-Level Physics course

The University Core Curriculum is the same across all undergraduate bachelor's programs. Please consult the academic advisor for your designated major before selecting courses in this area.

Summary

Code	Title	Hours
General Education Core Curriculum (p. 1)		42
Major Requirements (p. 2)		40
Other Requirements (p. 2)		38
Total Hours		**120**

General Education Core Curriculum (Standard)

Code	Title	Hours
Communication		
ENGL 1301	Freshman English I	3
ENGL 1302	Freshman English II	3
Mathematics		

MATH 2312	Precalculus Math	3
Life and Physical Sciences		
CHEM 1311	Chemistry I	3
PHYS 2325	University Physics I	3
Language, Philosophy, and Culture		
ENG 2XX		3
Creative Arts		
MUSI 1306	Music Appreciation	3
American History		
HIST 1301	Soc & Pol Hist US to 1877	3
HIST 1302	Soc & Pol Hist US Since 1877	3
Government/Political Science		
POLS 2305	American Government	3
POLS 2306	Texas Government	3
Social and Behavioral Sciences		
Select one of the following:		3
ECON 2301	Principles Of Economics I	
SOCI 1301	Introduction To Sociology	
PSYC 2301	General Psychology	
Institutional Options		
COMM 1315	Public Address	3
CHEM 1312	Chemistry II	3
Total Hours		**42**

Major (Physics)

Code	Title	Hours
PHYS 152	Pre University Physics	3
PHYS 217	University Physics Laboratory I	1
PHYS 2326	University Physics II	3
PHYS 218	University Physics Laboratory II	1
PHYS 332	Intro to Modern Physics	3
PHYS 333	Elec and Mag I	3
PHYS 336	Thermo & Stat Phys	3
PHYS 338	Math Methods I	3
PHYS 341	Mechanics I	3
PHYS 415	Senior Thesis I	1
PHYS 416	Senior Thesis II	1
PHYS 432	Quantum Mechanics I	3
"PHYS 360 Adv Undergrad Lab"		3
PHYS 437	Nuclear Physics I	3
PHYS 484	Topics in Physics (Course to be taken twice)	6
Total Hours		**40**

Other Requirements

Code	Title	Hours
MATH 2413	Calculus & Analytic Geomtry I	4
MATH 2414	Calculus&Analytic Geometry II	4
MATH 243	Calculus & Analytic Geo III	4
MATH 2318	Linear Algebra	3
MATH 251	Differential Equations	3
FS 102	Freshman Seminar/ first Year Experience	1
CHEM 111	Chemistry I Lab	1
CHEM 112	Chemistry II Lab	1
CS 120	Introduction to Programming Using C++	3
CS 124	Fund Machine Computation	3
CS 241	Advanced OOP Using C++	3
Engineering Electives		
Select one group from the following:		8
Group 1		
ECE 131	Circuit Analysis I	
ECE 311	Electronics Circuits Lab	
ECE 231	Circuit Analysis II	
ECE 211	Circuit AnalysisLab II	
Group 2		
CIVE 141	Civil Engineering Materials	
CIVE 141L	Civil Engineering Materials Lab	
CIVE 224	Geotechnical Engineering	
CIVE 224L	Geotechnical Engineering Lab	
Total Hours		**38**

Course	Title	Hours
First Year		
First Semester		
ENGL 1301	Freshman English I	3
PHYS 152	Pre University Physics	3
FS 102	Freshman Seminar/ first Year Experience	1
CHEM 1311	Chemistry I	3
CHEM 111	Chemistry I Lab	1
MATH 2312	Precalculus Math	3
	Hours	**14**
Second Semester		
ENGL 1302	Freshman English II	3
PHYS 2325	University Physics I	3
PHYS 217	University Physics Laboratory I	1
CHEM 1312	Chemistry II	3
CHEM 112	Chemistry II Lab	1
MATH 2413	Calculus & Analytic Geomtry I	4
	Hours	**15**
Second Year		
Third Semester		
HIST 1301	Soc & Pol Hist US to 1877	3
PHYS 2326	University Physics II	3
PHYS 218	University Physics Laboratory II	1
MATH 2414	Calculus&Analytic Geometry II	4
POLS 2305	American Government	3
CS 120	Introduction to Programming Using C++	3
	Hours	**17**
Fourth Semester		
HIST 1302	Soc & Pol Hist US Since 1877	3
PHYS 332	Intro to Modern Physics	3
CS 124	Fund Machine Computation	3
MATH 243	Calculus & Analytic Geo III	4
POLS 2306	Texas Government	3
	Hours	**16**

Third Year		
Fifth Semester		
MATH 2318	Linear Algebra	3
PHYS 336	Thermo & Stat Phys	3
PHYS 341	Mechanics I	3
Engineering Elective 1 [1]		3
LAB: Engineering Elective 1		1
CS 241	Advanced OOP Using C++	3
	Hours	**16**
Sixth Semester		
MATH 251	Differential Equations	3
Engineering Elective 2 [2]		3
"PHYS 360 Adv Undergrad Lab"		3
COMM 1321	Business & Professional Comm	3
LAB: Engineering Elective 2 [2]		1
ENG 2XX - Upper Level English [3]		3
	Hours	**16**
Fourth Year		
Seventh Semester		
PHYS 333	Elec and Mag I	3
PHYS 415	Senior Thesis I	1
PHYS 432	Quantum Mechanics I	3
Social Behavior Science Elective [4]		3
PHYS 484	Topics in Physics	3
	Hours	**13**
Eighth Semester		
PHYS 338	Math Methods I	3
PHYS 416	Senior Thesis II	1
PHYS 437	Nuclear Physics I	3
PHYS 484	Topics in Physics	3
MUSI 1306 or ARTS 1315	Music Appreciation or Intro African Art	3
	Hours	**13**
	Total Hours	**120**

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Engineering Elective 1: (ECE 131 Circuit Analysis I (Lecture); ECE 311 Electronics Circuits Lab (Lab), ECE 231 Circuit Analysis II (Lecture); ECE 211 Circuit AnalysisLab II (Lecture))
Courses at the 400 and 500 level in advanced topics in astrophysics, atomic and molecular physics, computational physics and medical health/radiation physics may replace engineering electives with the approval of student's faculty advisor.

2

Engineering Elective 2 (CIVE 141 Civil Engineering Materials (Lecture); CIVE 141L Civil Engineering Materials Lab (Lab), CIVE 224 Geotechnical Engineering (Lecture); CIVE 224L Geotechnical Engineering Lab (Lab))

3

ENG 2XX –ENGL 2328 African-American Literature or ENGL 2332 World Literature I or ENGL 2333 World Literature II

4

Social and Behavioral Science elective; consult with advisor. PSYC 2301 General Psychology or SOCI 1301 Introduction To Sociology or ECON 2301 Principles Of Economics I