PHYSICS - BS, COMPUTATIONAL SCIENCE TRACK

Physics and other sciences increasingly rely on advanced computer simulations and data analysis to develop realistic mathematical models of complex phenomena or process huge amounts of data coming from particle accelerators and astronomical surveys. The BS PHYS, Computational Science track will provide you with the skills to pursue advanced studies in this area or directly enter the workforce in virtually any industry, as the demand for experts with advanced computer skills will only grow with time.

Program Requirements

First Year

Fall
ENGL 104 or ENGL 103 Composition and Rhetoric or Introduction to Rhetoric and Composition 3
MATH 171 Calculus I 4
PHYS 101 Freshman Physics Orientation 1 1
PHYS 150 Introduction to Programming for Physics 1 3
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) 2 3

Spring
ASTR 102 Observational Astronomy 1
MATH 172 Calculus II 1 4
PHYS 206 & PHYS 226 Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences 1 4
American history (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history) 2 3
Language, philosophy and culture (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture) 2 3

Second Year

Fall
MATH 221 Several Variable Calculus 1 4
MATH 308 Differential Equations 1 3
PHYS 207 & PHYS 227 Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences 1 4
PHYS 221 Optics and Thermal Physics 1 3

Spring
CSCE 120 Program Design and Concepts 3

Semester Credit Hours 15

Third Year

Fall
CSCE 222/ECEN 222 Discrete Structures for Computing 3
PHYS 302 Advanced Mechanics I 3
PHYS 304 Advanced Electricity and Magnetism I 3
PHYS 332 Theoretical Methods for Physicists II 3
POLS 206 American National Government 3

Spring
CSCE 221 Data Structures and Algorithms 4
PHYS 303 or PHYS 305 Advanced Mechanics II or Advanced Electricity and Magnetism II 3
PHYS 327 Experimental Physics I 4 2
PHYS 328 Experimental Physics II 4 1
PHYS 412 Quantum Mechanics I 3
POLS 207 State and Local Government 3

Semester Credit Hours 16

Fourth Year

Fall
CSCE 312 Computer Organization 4
PHYS 408 Thermodynamics and Statistical Mechanics 4
Social and behavioral science (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences) 3
General elective 5 4

Spring
PHYS 401 Computational Physics 6 3
Creative arts (http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts) 3
Science or Technical elective 7 3
General elective 5 7

Semester Credit Hours 16

Total Semester Credit Hours 120

1 A physics major must complete the foundation courses (PHYS 101, PHYS 150, ASTR 102, PHYS 206/PHYS 226, PHYS 207/PHYS 227, PHYS 221, PHYS 309, PHYS 331, MATH 171, MATH 172, MATH 221, MATH 308) with a grade of C or better and have a 2.0 cumulative GPA before taking non-foundation upper-level physics courses.
2 Any course in this category from the approved University Core Curriculum list of courses.
3 Any approved Communication course, except PERF 407.
PHYS 327 is an approved W course. PHYS 328 is an approved C course.

Electives should be chosen in consultation with the student's advisor. Three hours must be in the area of International and Cultural Diversity, and three hours must be in the area of Cultural Discourse. These may be in addition to other University Core Curriculum courses, or, if a course in this category satisfies another area of the Core, it can be used to meet both requirements. Electives may be selected from any 100-499 course not used elsewhere, except ENGL 103; MATH 100-148, 165-166, 365-366 (http://catalog.tamu.edu/undergraduate/course-descriptions/math/); PHYS 201, PHYS 202.

To register for PHYS 401 a student must be able to program in a high level language.

Any upper-division course in geo/life/physical sciences, mathematics/statistics, or engineering (except 485/491).