

# PHYSICS - BS

The Bachelor of Science curriculum is more rigorous in its physics and mathematics course requirements than the Bachelor of Arts. Currently it has a no-track option and five track options. The BS in Physics (no-track) is designed primarily for students who wish to pursue an advanced degree in physics or employment as a professional physicist in an industrial setting. The department also offers tracks in Astrophysics, Business, Computational Science, Physics and Mathematics Teaching and Physical Science Teaching for those who plan to seek employment or advanced degrees in these fields. Each track results in the BS in Physics degree and has the same core physics courses and the same total number of hours. Because physics forms the basis of many other sciences such as astronomy, chemistry, material science, oceanography, nanoengineering and geophysics, the BS program is excellent preparation for advanced degrees in these fields. In addition, physicists are increasingly applying their talents to molecular biology, biochemistry and medicine. An important part of the BS program is student participation in experimental or theoretical research guided by faculty.

## Program Requirements

### First Year

		Semester Credit Hours
<b>Fall</b>		
ENGL 104 or ENGL 103	Composition and Rhetoric or Introduction to Rhetoric and Composition	3
MATH 171	Calculus I <sup>1</sup>	4
PHYS 101	Freshman Physics Orientation <sup>1</sup>	1
PHYS 150	Introduction for Programming for Physics <sup>1</sup>	3
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> ) <sup>2</sup>		3
<b>Semester Credit Hours</b>		<b>14</b>
<b>Spring</b>		
ASTR 102	Observational Astronomy	1
MATH 172	Calculus II <sup>1</sup>	4
PHYS 206 & PHYS 226	Newtonian Mechanics for Engineering and Science and Physics of Motion Laboratory for the Sciences <sup>1</sup>	4
American history ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#american-history</a> ) <sup>2</sup>		3
Language, philosophy and culture ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#language-philosophy-culture</a> ) <sup>2</sup>		3
<b>Semester Credit Hours</b>		<b>15</b>
<b>Second Year</b>		
<b>Fall</b>		
MATH 221	Several Variable Calculus <sup>1</sup>	4
MATH 308	Differential Equations <sup>1</sup>	3

PHYS 207 & PHYS 227	Electricity and Magnetism for Engineering and Science and Electricity and Magnetism Laboratory for the Sciences <sup>1</sup>	4
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PHYS 221	Optics and Thermal Physics <sup>1</sup>	3
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**Semester Credit Hours 14**

### Spring

PHYS 225	Electronic Circuits and Applications	3
PHYS 309	Modern Physics <sup>1</sup>	3
PHYS 331	Theoretical Methods for Physicists I <sup>1</sup>	3
POLS 207	State and Local Government	3

Communication ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#communication</a> ) <sup>3</sup>		3
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**Semester Credit Hours 15**

### Third Year

#### Fall

PHYS 302	Advanced Mechanics I	3
PHYS 304	Advanced Electricity and Magnetism I	3
PHYS 332	Theoretical Methods for Physicists II	3
Creative arts ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#creative-arts</a> ) <sup>2</sup>		3

Social and behavioral science ( <a href="http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences">http://catalog.tamu.edu/undergraduate/general-information/university-core-curriculum/#social-behavioral-sciences</a> ) <sup>2</sup>		3
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**Semester Credit Hours 15**

#### Spring

PHYS 303	Advanced Mechanics II	3
PHYS 305	Advanced Electricity and Magnetism II	3
PHYS 327	Experimental Physics I <sup>4</sup>	2
PHYS 328	Experimental Physics II <sup>4</sup>	1
PHYS 412	Quantum Mechanics I	3
POLS 206	American National Government	3

**Semester Credit Hours 15**

### Fourth Year

#### Fall

PHYS 408	Thermodynamics and Statistical Mechanics	4
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PHYS 414 or PHYS 416	Quantum Mechanics II or Physics of the Solid State	3
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PHYS 426	Physics Laboratory	2
Select one of the following: <sup>5</sup>		2

ASTR 291	Research	
ASTR 491	Research	
PHYS 291	Research	
PHYS 491	Research	

Physics elective <sup>6</sup>		3
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**Semester Credit Hours 14**

#### Spring

PHYS 401	Computational Physics <sup>7</sup>	3
PHYS 425	Physics Laboratory	2

Select one of the following: <sup>5</sup>		2
ASTR 291	Research	

ASTR 491	Research	
PHYS 291	Research	
PHYS 491	Research	
Science or technical elective <sup>8</sup>		3
General electives <sup>9</sup>		8
<b>Semester Credit Hours</b>		<b>18</b>
<b>Total Semester Credit Hours</b>		<b>120</b>

<sup>1</sup> 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.

<sup>2</sup> Any course in this category from the approved University Core Curriculum list of courses.

<sup>3</sup> Any approved Communication course, except PERF 407.

<sup>4</sup> PHYS 327 is an approved W course. PHYS 328 is an approved C course.

<sup>5</sup> A combination of PHYS 291, PHYS 491, ASTR 291 and ASTR 491 must equal 4 hours. Students with a U1 or U2 classification should take PHYS 291/ASTR 291. Students with a U3 or U4 classification should take PHYS 491 /ASTR 491.

<sup>6</sup> Select from ASTR 314, PHYS 414/PHYS 416, PHYS 489, MATH 460, or any graduate offering in PHYS or ASTR.

<sup>7</sup> To register for PHYS 401 a student must be able to program in a high level language.

<sup>8</sup> Any upper-division course in geo/life/physical sciences, mathematics/statistics, or engineering (except 485/491).

<sup>9</sup> Electives should be chosen in consultation with the student's academic 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.