Strongly Recommended Courses

Because physicists can choose among so many different careers, we can’t require all the classes that you might need to take. Based on experiences of what alumni wished they had taken, we suggest you consider the following classes, regardless of which physics major you choose.

*Experimental and applied physicists*: Stats 201 Statistics for Engineers and Scientists

*Theoretical physicists*: Consider Math 352, Introduction to Complex Analysis or Phys 601, 602 Mathematical physics

*All physicists*: Consider learning more programming skills and numerical methods, in computer courses or on your own, beyond what you are taught in CS 142 and our computational physics courses. Consider Math 410 Numerical Methods, and Mech Eng 373 Introduction to Scientific Computing and Computer-Aided Engineering.

*Astronomers*: If you're going on to graduate school in astronomy, instead of only the required two courses from Phys 360, 442, 452, 471, consider taking all four. Gain statistics and computer programming skills beyond what you get in this major by taking courses such as Statistics 201, (Statistics for engineers and scientists) and choosing among Physics 430 (Computational physics 3), Computer Science 142 (Intro to programming), or Mechanical Engineering 373 (Intro to scientific computing). If you are interested in planetary or exoplanetary science, consider taking Geology 109 (Geology of the Planets).
**B.S. Physics**

**Suggested semester:**

**Freshman**
1. PHYS 145 Expt. Phys (1.0 hr)
2. PHYS 140 Electronics (1.0 hr)
3. PHYS 191 Phys Careers & Research

**Sophomore**
1. MATH 113 Calculus II
3. MATH 313 Linear Alg
4. MATH 314 Calculus many variables

**Junior**
1. PHYS 321 Mechanics
2. PHYS 323 Modern Phys
3. PHYS 330 Computational Physics (1.0 hrs)
4. PHYS 331 Computational Physics (1.0 hrs)

**Senior**
1. PHYS 318 Math Phys
2. PHYS 360 Statistical/Thermal
3. PHYS 441 Elec & Mag
4. PHYS 451 Quantum

**Other optional advanced courses:**
(Prerequisites in parentheses)
- 399R Internship
- 427 Astrophysics (instructor’s consent)
- 461, 561 Acoustics (123, Math 334)
- 545 Plasma Physics (321, 441)
- 571 Lasers and Atoms (451, 471)
- 581 Solid State Physics (222)
- 585 Nanostructures & Surfaces (222)
- 586 Electron Microscopy
- 587 Semiconductor devices (281 or 581)
- 585 Thin-film Physics (222)
- 513R Various topics
- 601, 2 Mathematical Physics (Math 318, 334)

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**Notes:**
1. Math 112 (Calculus I) preparation is assumed in high school. If you studied differentiation and integration in high school, move on to Math 113.
2. If you want a more formal versus applied math preparation, and perhaps a math minor, take the math sequence on the right. It requires 3 more hours than the left track. Both tracks are good.
3. Senior Thesis is required; join research group as early as possible. Credit in Sr. year in 498R.
4. Physics 416, Writing in Physics, can replace Engl 316, and can help you write your thesis. Take it when your research is essentially complete.
B.S. Physics – Astronomy

Notes:
1. Math 112 (Calculus I) preparation is assumed in high school. If you studied differentiation and integration in high school, move on to Math 113.
2. Senior Thesis is required; join research group by So. or Jr. year. Credit in Sr. year in 498R.
3. Physics 416, Writing in Physics, can replace Engl 316, and can help you write your thesis. Take it when your research is essentially complete.

Suggested semester:
Freshman
1
MATH 113 Calculus II
FWSpSu

2
MATH 302 Adv Eng. Math
FW

Soph.
3
MATH 314 Calculus many variables
FWSpSu

4
MATH 303 OR 334 Diff. Equations
FW or FWSpSu

Junior
5
PHYS 321 Mechanics
FSp

6

Senior
7

8
W

Can also take Jr. year.

(Phys 471) Optics Prereq: 220, 123, math seq. Recom:
PHYS 441 Elec & Mag
WSu

W
Notes:
1. Math 112 (Calculus I) preparation is assumed in high school. If you studied differentiation and integration in high school, move on to Math 113.
2. There is great flexibility for a choice of emphases: technology, business, life sciences, pre-professional, etc. As soon as possible, meet with your dept. advisor to define an emphasis and choose 12 hours of electives in this emphasis. See policy, sample tracks 3-4 pages earlier.
3. A capstone project or senior thesis is required. Start by So. or Jr. year. See section in this handbook.
4. Physics 416, Writing in Physics, can replace Engl 316, and can help you write your thesis/report. Take it when your research is essentially complete.
B.S. Physics Teaching

**Suggested semester:**

**Freshman**

1. MATH 112 (or AP) Calculus I

2. MATH 113 Calculus II

**Sophomore**

3. MATH 302 Adv Eng. Math

4. MATH 314 Calculus many variables

**Junior**

5. MATH 303 OR 334 Diff. Equations

6. MATH 304 OR 334 Diff. Equations

7. (Rel. 491) Science/religion Phys/Math

8. (Rel. 492) Science/religion Phys/Math

**Senior**

9. FW or FWSpSu

**Notes:**

1. Please visit the teaching majors advisor early to ask questions.
2. Physics 230, Chemistry (105&106) and Meteorology (Phys 137) are highly recommended.
3. **12 hours of electives:** At most 6 hrs. from the following: Phscs 137, 167, 281, 310, 311, 313R., Hist 291, Phil 423. At least 6 hrs. from 300-, 400-, or 550-level physics courses, not including 310 or 311 (Phscs 321, 461, 471 are recommended).

See [www.aip.org/statistics/trends/reports/teacher.htm](http://www.aip.org/statistics/trends/reports/teacher.htm) to find out whom to contact to get the latest information on physics certification requirements in a state that interests you.

**Required**

**Prerequisite**

**Concurrent**

Note: Some teaching students prefer to put in more effort and get the B.S. in Physics while completing the teaching courses needed to certify. Another option is to get the B.S. in Applied Physics, and select education classes as your emphasis. These options give them the option to teach, continue to graduate school or work in industry. It is not necessary to get a teaching degree to certify to teach.