

(optional, exists within  
BS Phys degree)

Required courses for physics majors  
(On next page: BS Engineering Sciences!)

		BS Physics	Quantum Information Concentration	BS Physics & Astro.	BS Biophys.	BA Physics	BA Physics & Astro.
<b>Phys 116:</b> Introductory Astronomy				recommended			yes
<b>Phys 151*:</b> Phys. for Sci. and Eng. I	F	yes	yes	yes	yes	yes	yes
<b>Phys 152*:</b> Phys. for Sci. and Eng. II	S	yes	yes	yes	yes	yes	yes
<b>Phys 212:</b> Comp. Modeling for Sci., Eng.	S	yes	yes	yes	yes	yes	yes
<b>Phys 220**:</b> Math for Sci. and Eng.	F	yes	yes	yes	yes		
<b>Phys 253:</b> Modern Physics	F	yes	yes	yes	yes	yes	yes
<b>Phys 311:</b> Astrophysics I	S			yes			(one of these two)
<b>Phys 312:</b> Astrophysics II	S			yes			
<b>Phys 361:</b> Classical Mechanics	F	yes	yes	yes	yes	(one of these four)	(one of these four)
<b>Phys 365:</b> Electricity and Magnetism	S	yes	yes	yes	yes		
<b>Phys 421:</b> Thermo. and Stat. Physics	F	yes	yes	yes	yes		
<b>Phys 461:</b> Quantum Mechanics	S	yes	yes	yes	yes		
<b>Phys 444W:</b> Advanced Lab		yes	yes (as 445W)	yes	yes	yes	yes
<b>Phys 434, 552, 554, 556:</b> biophysics electives					2		
<b>Phys 397R, 495R or 499R:</b> 4 credits as 1 course					yes		
<i>ADDITIONAL PHYSICS ELECTIVES:</i> (One elective may be four credits of 397R, 495R, or 499R, as a single course)							
<b>must be at 200 level or higher</b>		1	must choose			2	
<b>must be at 300 level or higher</b>		1	phys422 & 463				
<i>COURSES IN OTHER DEPARTMENTS:</i>							
<b>Chem 150 w/lab</b>					(one of these two)		
<b>Bio 141 w/lab</b>							
<b>Math 111:</b> Calculus I		yes	yes	yes	yes	yes	yes
<b>Math 112:</b> Calculus II		yes	yes	yes	yes	yes	yes
<b>Math 211:</b> Multivariable Calculus		yes	yes	yes	yes	yes	yes
<b>Math 212:</b> Differential Equations		yes	yes	yes	yes	yes	yes

\*With permission of the Director of Undergraduate Studies, Phys 141/142 may replace Phys 151/152

\*\*Taking both MATH221 (Linear Algebra) and MATH351 (Partial Differential Equations) would excuse any BS major from the PHYS220 requirement. But please note: PHYS220 is a pre-req for many upper-level PHYS classes...you should **not** put off PHYS220 in, say, your second year in exchange for a nebulous I'll-take-two-extra-MATH-courses-in-Senior-year plan.

# BS Engineering Sciences

all engineering sciences students take the core classes, and then pick one “track” to complete

## Core classes

- PHYS 151 & 152
- CHEM 150/150L
- MATH 111, 112, 211, 212
- PHYS 212: Computational modeling for scientists & engineers
- PHYS 220<sup>\*\*</sup>: Math methods for scientists & engineers <sup>\*\*</sup> See footnote on previous page
- PHYS 222: Fundamentals of engineering design

## Engineering physics track

**PHYS 253:** Modern Physics  
**PHYS 234:** Digital electronics  
**PHYS 361:** Classical mechanics  
**PHYS 365:** Electricity & magnetism  
**PHYS 421:** Thermo & stat physics  
**PHYS 461:** Quantum mechanics  
**PHYS 444W:** Advanced lab

### 1 elective from:

MATH 315 (numerical analysis)  
MATH 345 (math modeling)  
MATH 351 (partial dif. eq.)  
MATH 361 (prob and stats)  
PHYS 422 (applied solid state phys)  
PHYS 432 (optics)  
PHYS 525 (solid state physics)  
PHYS 564 (polymer physics)  
PHYS 528 (continuum mechanics)  
PHYS 495 or 499 (research†)

† must be 4 research credits as a single course in a single semester

## Materials science track

Two semesters of Reactivity lectures & labs:  
**CHEM 202, 202L, 203, and 203L**

AND

Two semesters of Quantum Mechanics lectures & labs:  
Taken either in the Chemistry Department:  
**CHEM 205, 205L, 333, and (335L or 330L)**  
*...be careful with CHEM pre-reqs for those*

Or taken in the Physics Department:  
**PHYS 253, 421, and 444W**

AND

### 2 Electives from:

CHEM 340 (biochemistry)  
CHEM 350 (inorganic chemistry)  
PHYS 422 (applied solid state phys)  
PHYS 461 (quantum)  
CHEM 571 (biomolecular chemistry)  
CHEM 572 (adv. biophysical chem)  
PHYS 525 (solid state physics)  
PHYS 528 (continuum mechanics)  
PHYS 554 (molecular biophysics)  
PHYS 564 (polymer physics)  
PHYS 562 (soft condensed matter)  
PHYS 552 (biomacromolecules)

1 elective may be Phys or Chem 495 or 499 (research†)

## Geoscience track

**ENVS 120 or 130**

**ENVS 131 or ENVS OX 131Q:** Intro Env. Studies

**ENVS 331:** Earth Systems Science

**PHYS 253:** Modern Physics

**PHYS 421:** Thermo & Stat Physics

### 5 electives, including at least one with lab (marked \*), from:

ENVS 222\* (Evolution of the Earth w/ Lab)  
ENVS 229\* (Atmosp. Science) / GEOL OX 115\*  
ENVS 230\* (Fund. Geo.) / GEOL OX 141\*  
ENVS 235 (Env. Geo.)  
ENVS 239 (Physical Oceanography)  
ENVS 250\* (Cartography)  
GEOL OX 250\* (Mineral Resources)  
ENVS 270 (Env. Data Science)  
ENVS 326 (Climate Change & Society)  
ENVS 328 (Intro Atmos Chem)  
ENVS 330 (Climatology)  
ENVS 347 (Landscapes & Geomorphology)  
(counts as \* if taken with ENVS 347L)  
ENVS 348\* (Sust. Water Res.)  
ENVS 365 (Urban Geography)  
CS 170\* (Intro to Computer Science)  
PHYS 528 (Continuum Mechanics)

Notes: The ENVS OX editions of 222\*, 229\*, 230\*  
are equally acceptable

1 elective may be 399, 494, 498, or 499 (research†)