

(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.
Phys 116: Introductory Astronomy				recommended			yes
Phys 151*: Phys. for Sci. and Eng. I	F	yes	yes	yes	yes	yes	yes
Phys 152*: Phys. for Sci. and Eng. II	S	yes	yes	yes	yes	yes	yes
Phys 212: Comp. Modeling for Sci., Eng.	S	yes	yes	yes	yes	yes	yes
Phys 220**: Math for Sci. and Eng.	F	yes	yes	yes	yes		
Phys 253: Modern Physics	F	yes	yes	yes	yes	yes	yes
Phys 311: Astrophysics I	S			yes			<i>(one of these two)</i>
Phys 312: Astrophysics II	S			yes			
Phys 361: Classical Mechanics	F	yes	yes	yes	yes	<i>(one of these four)</i>	<i>(one of these four)</i>
Phys 365: Electricity and Magnetism	S	yes	yes	yes	yes		
Phys 421: Thermo. and Stat. Physics	F	yes	yes	yes	yes		
Phys 461: Quantum Mechanics	S	yes	yes	yes	yes		
Phys 444W: Advanced Lab		yes	yes (as 445W)	yes	yes	yes	yes
Phys 430, 434, 552, 554, 556: biophysics electives					2		
Phys 397R, 495R or 499R: 4 credits as 1 course					yes		
<i>ADDITIONAL PHYSICS ELECTIVES:</i> (One elective may be 3 or more credits of 397R, 495R, or 499R, as a single course)							
must be at 200 level or higher		1	must choose			2	
must be at 300 level or higher		1	phys422 & 463				
<i>COURSES IN OTHER DEPARTMENTS:</i>							
Chem 150 w/lab					<i>(one of these two)</i>		
Bio 141 w/lab							
Math 111: Calculus I		yes	yes	yes	yes	yes	yes
Math 112: Calculus II		yes	yes	yes	yes	yes	yes
Math 211: Multivariable Calculus		yes	yes	yes	yes	yes	yes
Math 212: 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

Core classes

- PHYS 151 & 152
- CHEM 150/150L
- MATH 111, 112, 211, 212
- PHYS 212: Computational modeling for scientists & engineers
- PHYS 220^{**}: Math methods for scientists & engineers ^{**} 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 3 or more 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 ONE OF TWO PATHS:

PATH 1: **CHEM 205, CHEM 205L**, plus an additional **6+ credits** of chemistry or physics courses at the 300+-level related to quantum mechanics and/or physical chemistry‡

PATH 2: **PHYS 253, PHYS 421, and PHYS 444W or 445W.**

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†)

‡Recommended and pre-approved courses for the additional 6 credits are CHEM 333 and CHEM 335L. However *special topics courses and labs*, listed as CHEM 370 and CHEM371L, related to physical or biophysical chemistry, quantum mechanics, or biochemistry, can also be accepted (**check with the DUS prior to enrollment**). PHYS 445W can also count towards the 6 additional credits.

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* (Atmosph. 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†)