(concentrations are optional paths within BS Physics degree)

Required courses for physics majors (On next page: BS Engineering Sciences!)		BS Physics	Physics w/ AI Concentration	Quantum Information Concentration	BS Physics & Astronomy	BS Biophysics	BA Physics	BA Physics & Astronomy
Phys 116: Introductory Astronomy					recommended			yes
Phys 151*: Phys. for Sci. and Eng. I	F	yes	yes	yes	yes	yes	yes	yes
Phys 152*: Phys. for Sci. and Eng. II	S	yes	yes	yes	yes	yes	yes	yes
Phys 212: Comp. Modeling for Sci., Eng.	S	yes	yes	yes	yes	yes	yes	yes
Phys 220**: Math for Sci. and Eng.	F	yes	yes	yes	yes	yes		
Phys 253: Modern Physics	F	yes	yes	yes	yes	yes	yes	yes
Phys 311: Astrophysics I	S				yes			*(one of*
Phys 312: Astrophysics II	S				yes			*these two)*
Phys 361: Classical Mechanics	F	yes	yes	yes	yes	yes	*(one*	*(one*
Phys 365: Electricity and Magnetism	S	yes	yes	yes	yes	yes	*of*	*of*
Phys 421: Thermo. and Stat. Physics	F	yes	yes	yes	yes	yes	*these*	*these*
Phys 461: Quantum Mechanics	S	yes	yes	yes	yes	yes	*four)*	*four)*
Phys 444W: Advanced Lab		yes	yes	yes (as 445W)	yes	yes	yes	yes
Phys 430, 554, 556: biophysics electives***						2		
Phys 397R, 495A/B or 499R: 3+ credits as 1 course						yes		
ADDITIONAL PHYSICS ELECTIVES: (One elective may be 3 or more credits of 397R, 495A/B, or 499R, as a single course)								
must be at 200 level or higher		1	must choose	must choose			2	
must be at 300 level or higher		1	phys436 & 437	phys422 & 463				
COURSES IN OTHER DEPARTMENTS:								
Chem 150 w/lab						*(one of*		
Bio 141 w/lab						*these two)*		
Math 111: Calculus I		yes	yes	yes	yes	yes	yes	yes
Math 112: Calculus II		yes	yes	yes	yes	yes	yes	yes
Math 211: Multivariable Calculus		yes	yes	yes	yes	yes	yes	yes
Math 212: Differential Equations		yes	yes	yes	yes	yes	yes	yes

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

Taking <u>both</u> MATH221 (Linear Algebra) <u>and</u> 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.

***With permission of the Director of Undergraduate Studies, relevant special topics courses (PHYS 380) may count as a biophysics elective.

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**: Math methods for scientists & engineers
- PHYS 222: Fundamentals of engineering design

** See footnote on previous page

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

***+ Either* PATH 1 or PATH 2:**

PATH 1**: CHEM 205, 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**, **421**, and **444W/445W**

+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 in PATH 1 are CHEM 333, 335L, and CHEM 334**. However, relevant special topics courses and labs (listed as CHEM 370 and CHEM371L) may be eligible *pending prior DUS approval*. 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* (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†)