

BACHELOR OF SCIENCE IN PHYSICS ROADMAP – QUANTITATIVE REASONING CATEGORY I/II AND ENG 114

120 Total Units Required

Minimum Number of Units in the Major: 71

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

Course	Title	Units
First Semester		
ENG 114	Writing the First Year: Finding Your Voice (A2) ¹	3
MATH 226	Calculus I (Major Lower-Division Prerequisite, B4) ²	4
GE Area A ³		3
GE Area C		3
GE Area D		3
		Units 16
Second Semester		
CSC 309	Computer Programming (Upper-Division Core) ⁴	3
MATH 227	Calculus II (Major Lower-Division Prerequisite)	4
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Lower-Division Prerequisite, B1, B3)	4
GE Area E		3
		Units 14
Third Semester		
MATH 228	Calculus III (Major Lower-Division Prerequisite)	4
PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Lower-Division Prerequisite)	4
GE Area A		3
Select One:		3

SF State Studies or University Elective (if selecting MATH 245)		
MATH 325	Linear Algebra (if selecting MATH 376)	
		Units 14
Fourth Semester		
Select One (Major Lower-Division Prerequisite):		3
MATH 245	Elementary Differential Equations and Linear Algebra (Major Lower-Division Prerequisite)	
MATH 376	Ordinary Differential Equations I	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Lower-Division Prerequisite)	4
GE Area B: Life Science (B2)		3
GE Area C		3
GE Area D		3
		Units 16
Fifth Semester		
PHYS 320 & PHYS 321	Modern Physics I and Modern Physics Laboratory (Major Upper-Division Core)	5
PHYS 330	Analytical Mechanics I (Major Upper-Division Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Upper-Division Core)	3
GE Area C		3
		Units 14
Sixth Semester		
PHYS 360	Electricity and Magnetism I (Major Upper-Division Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Upper-Division Core)	3
Major Elective (10 Units Total) - Take One ⁵		3
GE Area F [±]		3
GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)		3
		Units 15
Seventh Semester		
PHYS 430	Quantum Mechanics I (Major Upper-Division Core)	3

PHYS 460	Electricity and Magnetism II (Major Upper-Division Core)	3
PHYS 490	Physics Project Laboratory (Major Upper-Division Core)	2
Major Elective (10 Units Total) - Take One ⁵		3
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
Units		17
Eighth Semester		
PHYS 457	Introduction to Analog Electronics (Major Upper-Division Core)	4
PHYS 491GW	Advanced Laboratory II - GVAR (Major Upper-Division Core)	1
PHYS 695	Culminating Experience in Physics (Major Upper-Division Core)	1
Major Elective (10 Units Total) – Take Two ⁵		5
U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg)		3
Units		14
Total Units		120

¹ ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

² To determine the best B4 course option, students should complete the online advising activity at mathadvising.sfsu.edu (<https://mathadvising.sfsu.edu/>). Questions? Contact Gator Smart Start. (<https://gatorsmartstart.sfsu.edu/>)

³ To avoid taking additional units, it is recommended that you meet the **SF State Studies** (AERM, GP, ES, SJ) requirements within your GE or major.

⁴ Additional upper-division elective units in astronomy, mathematics, or physics may be substituted for CSC 309 by students proficient in computer programming, subject to approval by the department chair.

⁵ **Major Electives (10 units)**
Upper-division astronomy, physics, mathematics, or related sciences courses.

± Given catalog rights, fall 2022 transfer students do not need to complete an Area F course.