

BACHELOR OF SCIENCE IN PHYSICS: CONCENTRATION IN PHYSICS FOR TEACHING - QUANTITATIVE REASONING CATEGORY III/IV AND ENG 114

120 Total Units Required
Minimum Number of Units in the Major: 64

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 197	Prelude to Calculus I (Prerequisite for MATH 226) ^{2,3}	3
GE Area A ⁴		3
GE Area D		3
SF State Studies or University Elective		3
	Units	15
Second Semester		
MATH 198	Prelude to Calculus II (Prerequisite for MATH 226, B4) ^{2,3}	3
GE Area A		3
GE Area C		3
GE Area E		3
SF State Studies or University Elective		2
	Units	14
Third Semester		
MATH 226	Calculus I (Major Prerequisite, B4) ^{2,3}	4
GE Area B: Life Science (B2)		3
GE Area C		3
GE Area D		3
	Units	13
Fourth Semester		
MATH 227	Calculus II (Major Prerequisite)	4
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Prerequisite, B1, B3)	4
GE Area C		3

GE Area D		3
	Units	14
Fifth Semester		
MATH 228	Calculus III (Major Prerequisite)	4
PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Prerequisite)	4
Major Elective (12 Units Total) - Take One ⁵		3
GE Area UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective (if selecting MATH 245) or		3
MATH 325	Linear Algebra (if selecting MATH 376)	
	Units	17
Sixth Semester		
MATH 245 or MATH 376	Elementary Differential Equations and Linear Algebra (Major Prerequisite) or Ordinary Differential Equations I	3
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Prerequisite)	4
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
SF State Studies or University Elective		3
	Units	16
Seventh Semester		
PHYS 320	Modern Physics I (Major Upper-Division Core)	3
PHYS 321	Modern Physics Laboratory (Major Upper-Division Core)	2
PHYS 330	Analytical Mechanics I (Major Upper-Division Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Upper-Division Core)	3
Major Elective (12 Units Total) - Take Two ⁵		3
	Units	14

Eighth Semester

PHYS 360	Electricity and Magnetism I (Major Upper-Division Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Upper-Division Core)	3
SCI 652	SF State Science Partners in K-12 Schools (Major Upper-Division Core)	4
Major Elective (12 Units Total) - Take One ⁵		3
Units		13

Ninth Semester

PHYS 490	Physics Project Laboratory (Major Upper-Division Core)	2
Units		2

Tenth Semester

PHYS 491GW	Advanced Laboratory II - GVAR (Major Upper-Division Core)	1
PHYS 695	Culminating Experience in Physics (Major Upper-Division Core)	1
Units		2
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 Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (<http://cms.sfsu.edu/content/student-center/>). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (<http://developmentalstudies.sfsu.edu/>).

³ QR Category III students with a grade of B or higher in high school pre-calculus in the past year may be able to enroll in MATH 226. Please see a department advisor.

⁴ To avoid taking additional units, it is recommended that you meet **SF State Studies** requirements (AERM, GP, ES, SJ) within your GE or major.

⁵ Selected in consultation with a departmental advisor to prepare to teach a second subject in addition to physics, or general science at the 9th grade level. Electives may be lower-division or upper-division courses.