BACHELOR OF ARTS IN PHYSICS: CONCENTRATION IN ASTRONOMY - QUANTITATIVE REASONING CATEGORY III/IV AND ENG 114

120 Total Units Required
Minimum Number of Units in the Major: 52

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 C		3
GE Area D		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 D		3
GE Area E		3
	Units	15
Third Semester		
ASTR 115	Introduction to Astronomy (Major Lower-Division Prerequisite, B1)	3
MATH 226	Calculus I (Major Lower-Division Prerequisite, B4) [2,3]	4
GE Area C		3
GE Area D		3
SF State Studies or University Elective [5]		3
	Units	16
Fourth Semester		
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 B: Life Science (B2)		3
SF State Studies or University Elective [5]		3
	Units	14
Fifth Semester		
ASTR 301	Observational Astronomy Laboratory (Major Upper-Division Core)	2
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 UD-B: Upper-Division Physical and/or Life Sciences (Consider SF State Studies Course)		3
SF State Studies or University Elective [5]		3
	Units	16
Sixth Semester		
ASTR 300	Stars, Planets, and the Milky Way (Major Upper-Division Core)	3
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Lower-Division Prerequisite)	4
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course)		3
SF State Studies or University Elective - Take Two [5]		6
	Units	16
Seventh Semester		
PHYS 320 & PHYS 321	Modern Physics I and Modern Physics Laboratory (Major Upper-Division Core)	5
Major Elective - Take Two [6]		6
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course)		3
	Units	14
Eighth Semester		
ASTR 340GW	The Big Bang - GWAR (Major Upper-Division Core)	3

ASTR 470	Observational Techniques in Astronomy (Major Upper-Division Core)	3
PHYS 695	Culminating Experience in Physics (Major Upper-Division Core)	1
Major Elective - Take One [6]		3
SF State Studies or University Elective [5]		4
	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 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 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 **Complementary Studies**
Upon completion of the B.A. in Physics program, students will have taken 12 units of Calculus courses that satisfy the Complementary Studies requirement for a B.A. degree.
Students who have earned AA-T or AS-T degrees and are pursuing a similar B.A. degree at SF State are required to fulfill the Complementary Studies requirement as defined by the major department. Students should consult with a major advisor about how transfer units and/or SF State units can best be applied to this requirement in order to ensure degree completion within 60 units.

6 **Major Elective (8 units)**
At least 8 units of upper-division courses in astronomy, physics, geosciences, mathematics or related subjects, selected on advisement. No more than 3 units of 600 level courses may count toward this requirement.