

BACHELOR OF ARTS IN PHYSICS: CONCENTRATION IN ASTRONOMY ROADMAP – QUANTITATIVE REASONING CATEGORY III/IV

120 Total Units Required

Minimum Number of Units in the Major: 54

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 your Degree Planner (<https://registrar.sfsu.edu/degreeplanner/>) and an advisor for further guidance.

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.

Course	Title	Units
First Semester		
MATH 197	Prelude to Calculus I (Prerequisite for MATH 226) ¹	3
PHYS 200	Planning for Success as a Physics & Astronomy Major (Major Prerequisite)	1
GE Area 1: English Communication		3
GE Area 3: Arts and Humanities		3
GE Area 4: Social and Behavioral Sciences ²		3
SF State Studies or University Elective ³		3
Units		16
Second Semester		
ASTR 115 & ASTR 116	Introduction to Astronomy and Astronomy Laboratory (Major Prerequisite, GE 5A, GE 5C)	4
MATH 198	Prelude to Calculus II (Prerequisite for MATH 226, GE 2) ¹	3
GE Area 1A: English Composition ⁴		3
GE Area 3: Arts and Humanities		3
SF State Studies or University Elective ³		3
Units		16
Third Semester		
MATH 226	Calculus I (Major Lower-Division Prerequisite, GE 2) ¹	4
GE Area 1: English Communication		3
GE Area 4: Social and Behavioral Sciences ²		3
GE Area 6: Ethnic Studies (https://bulletin.sfsu.edu/undergraduate-education/general-education/areasix/)		3

SF State Studies or University Elective ³		3
Units		16
Fourth Semester		
Select One (Major Upper-Division Core):		3
CSC 309	Computer Programming	
MATH 209	Mathematical Computing	
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, GE 5A, GE 5C)	4
GE Area 5B: Biological Science		3
Units		14
Fifth 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 5UD or 2UD: Upper-Division Sciences or Upper-Division Mathematical Concepts		3
SF State Studies or University Elective ³		3
Units		14
Sixth Semester		
ASTR 300	Stars, Planets, and the Milky Way (Major Upper-Division Core)	3
Select One (Major Lower-Division Prerequisite):		3
MATH 225	Introduction to Linear Algebra	
MATH 245	Elementary Differential Equations and Linear Algebra	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Lower-Division Prerequisite)	4
GE Area 4UD: Upper-Division Social and Behavioral Sciences		3

U.S. and California Government (https://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg)	3
Units	16
Seventh Semester	
ASTR 301	Observational Astronomy Laboratory (Major Upper-Division Core) 2
Select One (Major Lower-Division Prerequisite):	3
MATH 376	Ordinary Differential Equations I (if MATH 225 taken)
SF State Studies or University Elective (if MATH 245 taken) ³	
PHYS 320	Modern Physics I (Major Upper-Division Core) 3
Major Upper-Division Elective (3-6 units) ⁵	3
GE Area 3UD: Upper-Division Arts or Humanities	3
Units	14
Eighth Semester	
ASTR 340GW	The Big Bang - GVAR (Major Upper-Division Core) 3
Culminating Experience (Select 2 Units):	2
ASTR 685	Projects in the Teaching of Astronomy
ASTR 697	Senior Project
PHYS 686	Experiences in Teaching Physics
Select One:	3
Major Upper-Division Elective (3-6 units) (if MATH 245 taken) ⁵	
SF State Studies or University Elective (if MATH 225/MATH 376 taken) ³	
SF State Studies or University Elective - Take Two ³	6
Units	14
Total Units	120

Choose enough upper-division PHYS and/or ASTR courses to reach 54 units for the major, excluding 600-level PHYS or ASTR courses. Maximum of 3 units outside of ASTR or PHYS, with prior permission of a faculty advisor. With permission of a faculty advisor, extra units in 600-level courses not used to satisfy the culminating experience can be used as electives.

¹ Students should use their Pathway/Category (<https://gatorsmartstart.sfsu.edu/pathways/>) to determine the appropriate GE 2 course option. For directions on how to view your Pathway/Category, visit how to find your pathway (<https://gatorsmartstart.sfsu.edu/howtofindyourpathways/>). Questions? Contact Gator Smart Start. (<https://gatorsmartstart.sfsu.edu/>)

² First-time freshmen must take one lower-division Area 4 course that meets US History (USH).

³ **Complementary Studies**

Upon completion of the BA in Physics program, students will have taken 12 units of calculus courses that satisfy Complementary Studies.

⁴ Students should use their Pathway/Category (<https://gatorsmartstart.sfsu.edu/pathways/>) to determine the appropriate GE 1A course option. For directions on how to view your Pathway/Category, visit how to find your pathway (<https://gatorsmartstart.sfsu.edu/howtofindyourpathways/>). Questions? Contact Gator Smart Start. (<https://gatorsmartstart.sfsu.edu/>)

⁵ Electives (3-6 units)