

# BACHELOR OF ARTS IN PHYSICS: CONCENTRATION IN ASTRONOMY ROADMAP

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 an advisor in your major program for further guidance.

Course	Title	Units
<b>First Semester</b>		
ENG 114	Writing the First Year: Finding Your Voice (A2) <sup>1</sup>	3
MATH 226	Calculus I (Major Lower-Division Prerequisite, B4) <sup>2</sup>	4
PHYS 200	Planning for Success as a Physics & Astronomy Major (Major Prerequisite)	1
GE Area A <sup>3</sup>		3
GE Area C - Take Two		6
		<b>Units 17</b>
<b>Second Semester</b>		
ASTR 115 & ASTR 116	Introduction to Astronomy and Astronomy Laboratory (Major Prerequisite, B1, B3)	4
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
		<b>Units 15</b>
<b>Third Semester</b>		
Select One (Major Upper-Division Core):		3
CSC 309	Computer Programming	
MATH 209	Mathematical Computing	
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
		<b>Units 14</b>
<b>Fourth Semester</b>		
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 B: Life Science (B2)		3
GE Area D		3
		<b>Units 16</b>
<b>Fifth Semester</b>		
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) <sup>4</sup>		
PHYS 320	Modern Physics I (Major Upper-Division Core)	3
GE Area C		3
GE Area D		3
		<b>Units 14</b>
<b>Sixth Semester</b>		
ASTR 340GW	The Big Bang - GWAR (Major Upper-Division Core)	3
Major Upper-Division Elective (3-6 units) <sup>5</sup>		3
Select One:		3
Major Upper-Division Elective (3-6 units) (if MATH 245 taken) <sup>5</sup>		
SF State Studies or University Elective (if MATH 225/MATH 376 taken) <sup>4</sup>		
GE Area F <sup>±</sup>		3

U.S. and California Government ( <a href="http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg">http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg</a> )	3
<b>Units</b>	<b>15</b>
<b>Seventh Semester</b>	
Culminating Experience (Select 2 Units):	2
ASTR 685	Projects in the Teaching of Astronomy
ASTR 697	Senior Project
PHYS 686	Experiences in Teaching Physics
GE Area UD-B: Upper-Division Physical and/or Life Sciences	3
GE Area UD-C: Upper-Division Arts and/or Humanities	3
GE Area UD-D: Upper-Division Social Sciences	3
SF State Studies or University Elective <sup>4</sup>	3
<b>Units</b>	<b>14</b>
<b>Eighth Semester</b>	
SF State Studies or University Elective - Take Five <sup>4</sup>	15
<b>Units</b>	<b>15</b>
<b>Total Units</b>	<b>120</b>

<sup>1</sup> 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.

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

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

<sup>4</sup> **Complementary Studies**

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

<sup>5</sup> **Electives (3-6 units)**

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.

± Given catalog rights, fall 2023 transfer students do not need to complete an Area F course.