

# BACHELOR OF SCIENCE IN PHYSICS: CONCENTRATION IN ASTROPHYSICS – PHYS ASSOCIATE DEGREE FOR TRANSFER (ADT) ROADMAP

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This is a sample pathway for students who transfer to San Francisco State University in the current Bulletin year with an AS-T in Physics. Twenty-four units in the major (MATH 226, MATH 227, MATH 228, PHYS 220, PHYS 222, PHYS 230, PHYS 232, PHYS 240, and PHYS 242) and all lower-division GE requirements have been satisfied. Additional units in the major may have been satisfied. Check with a major advisor about the most appropriate course sequence. **Degree completion guaranteed in 60 units; see the Associate Degree for Transfer (ADT) section for more information (<http://bulletin.sfsu.edu/undergraduate-admissions/transfer-students/>).**

## To Do at SF State:

Enough total units to reach 120 minimum for graduation; 30 units minimum at the upper-division level; to include the following:

### University-Wide Requirements: 9-15 Units

- American Institutions (0-6 units) - US History, US Government, California State and Local Government. See next bullet if not completed before transfer.
- Upper division GE (9 units): Courses approved for both UD GE and American Institutions may double-count.
- Students entering the major with the AS-T in Physics are not required to fulfill SF State Studies or Complementary Studies requirements.

### Physics B.S. (Astrophysics) Major: 44-47 units

MATH 226, MATH 227, MATH 228, PHYS 220, PHYS 222, PHYS 230, PHYS 232, PHYS 240, and PHYS 242 met in transfer.

- Prerequisites (3 units if MATH 245 equivalent not completed before transfer; see note 3 above)
- Upper-division Requirements (38 units)
- Upper-division Electives (6 units): Units in physics or astronomy selected with the consent of advisor. Three of the six elective units must be in courses numbered 400-499. No more than one unit of a 600-level ASTR course may count towards the electives.

### University Electives: 4 or More Units

Depends on course choices made at the community college, how transferred units are applied to the requirements above, and course choices at SF State. Some courses may meet more than one requirement, e.g., both in UD GE and the major.

Course	Title	Units
<b>First Semester</b>		
Select One (UD-C, USH, CSLG):		3
HIST 470	The U.S. Constitution to 1896 (AERM, SJ)	
HIST 471	The U.S. Constitution Since 1896 (AERM, SJ)	
Select One:		3
University Elective (if selecting MATH 245)		
MATH 325	Linear Algebra (if selecting MATH 376)	
GE Area UD-B: Upper-Division Physical and/or Life Sciences		3
	<b>Units</b>	<b>9</b>
<b>Second Semester</b>		
ASTR 300	Stars, Planets, and the Milky Way (Major Upper-Division Core)	3
CSC 309	Computer Programming (Major Upper-Division Core)	3
Select One (Major Lower-Division Prerequisite):		3

MATH 245	Elementary Differential Equations and Linear Algebra	
MATH 376	Ordinary Differential Equations I	
GE Area UD-D: Upper-Division Social Sciences		3
	<b>Units</b>	<b>12</b>
<b>Third Semester</b>		
ASTR 301	Observational Astronomy Laboratory (Major Upper-Division Core)	2
PHYS 320	Modern Physics I (Major Upper-Division Core)	3
PHYS 330	Analytical Mechanics I (Major Upper-Division Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Upper-Division Core)	3
	<b>Units</b>	<b>11</b>
<b>Fourth Semester</b>		
ASTR 340GW	The Big Bang - GWAR (Major Upper-Division Core)	3
PHYS 360	Electricity and Magnetism I (Major Upper-Division Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Upper-Division Core)	3
	<b>Units</b>	<b>9</b>
<b>Fifth Semester</b>		
ASTR 400	Stellar Astrophysics (Major Upper-Division Core)	3
PHYS 430	Quantum Mechanics I (Major Upper-Division Core)	3
Major Elective - Take One <sup>1</sup>		3
	<b>Units</b>	<b>9</b>
<b>Sixth Semester</b>		
ASTR 470	Observational Techniques in Astronomy (Major Upper-Division Core)	3
Select One (Major Culminating Experience):		3
ASTR 498 & PHYS 695	Astronomy Research Literature and Culminating Experience in Physics	
ASTR 697	Senior Project	
Major Elective - Take One <sup>1</sup>		3
University Elective		1
	<b>Units</b>	<b>10</b>
	<b>Total Units</b>	<b>60</b>

<sup>1</sup> **Major Electives (6 units)**

Chosen from upper-division courses in Physics or Astronomy with consent of an advisor. Three of the 6 units must be in a course(s) numbered 400–499. Up to 1 unit of a 600 level course in ASTR may count toward this requirement. If MATH 325 was taken, those units can be applied to this requirement.