

# 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 (3-6 units, see Note 1 below)
- Upper-division Requirements (38 units)
- Upper-division Electives (3-6 units): Students must take one 400-level PHYS and/or ASTR course. Student who take MATH 245 must take additional electives to reach 72 units for the major, which can be an additional 3 upper division units in PHYS and/or ASTR, or a course outside of PHYS or ASTR with prior permission of a faculty advisor.

### University Electives: 3 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>		
ASTR 301	Observational Astronomy Laboratory (Major Upper-Division Core)	2
Select One (Major Upper-Division Core):		3
CSC 309	Computer Programming	
MATH 209	Mathematical Computing	
MATH 245	Elementary Differential Equations and Linear Algebra (Major Prerequisite) <sup>1</sup>	3
PHYS 200	Planning for Success as a Physics & Astronomy Major (Major Prerequisite)	1
PHYS 320	Modern Physics I (Major Upper-Division Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Upper-Division Core)	3
	<b>Units</b>	<b>15</b>

**Second Semester**

ASTR 300	Stars, Planets, and the Milky Way (Major Upper-Division Core)	3
ASTR 470	Observational Techniques in Astronomy (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
GE Area UD-D: Upper-Division Social Sciences		3
		<b>Units</b>
		<b>15</b>

**Third Semester**

ASTR 400	Stellar Astrophysics (Major Upper-Division Core)	3
ASTR 697	Senior Project (Major Upper-Division Core)	3
PHYS 330	Analytical Mechanics I (Major Upper-Division Core)	3
PHYS 430	Quantum Mechanics I (Major Upper-Division Core)	3
GE Area UD-B: Upper-Division Physical and/or Life Sciences		3
		<b>Units</b>
		<b>15</b>

**Fourth Semester**

ASTR 340GW	The Big Bang - GWAR (Major Upper-Division Core)	3
Major Elective - Take Two <sup>2</sup>		6
Select One (UD-C, USH, USG/CSLG):		3
HIST 470	The U.S. Constitution to 1896 (AERM, SJ)	
HIST 471	The U.S. Constitution Since 1896 (AERM, SJ)	
University Elective		3
		<b>Units</b>
		<b>15</b>
		<b>Total Units</b>
		<b>60</b>

<sup>1</sup> Students may also fulfill this requirement with both MATH 225 and MATH 376. This option may increase time to graduation. Speak with an advisor.

<sup>2</sup> **Major Electives (3-6 units)**

Students must take one 400-level PHYS and/or ASTR course. Student who take MATH 245 must take additional electives to reach 72 units for the major, which can be an additional 3 upper division units in PHYS and/or ASTR, or a course outside of PHYS or ASTR with prior permission of a faculty advisor.