BACHELOR OF SCIENCE IN PHYSICS: CONCENTRATION IN ASTROPHYSICS – PHYS
ASSOCIATE DEGREE FOR TRANSFER ROADMAP

This is a sample pathway for students who transfer to San Francisco State University in 2017–2018 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, 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).

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tr>
<td><strong>First Semester</strong></td>
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| ASTR 301             | Observational Astronomy Laboratory 
MATH 245 or MATH 376 | Elementary Differential Equations and Linear Algebra  
PHYS 320 | Modern Physics I  | 2  |
| GE Area A: Written English Communication II (A4)  
or University Elective if A4 was met before transfer | 3  |
| GE Area UD–B: Upper Division Physical and/or Life Sciences  | 3  |
| **Units**            |                                                                      | 14   |
| **Second Semester**  |                                                                      |       |
| ASTR 300             | Stars, Planets, and the Milky Way  
ASTR 340GW            | The Big Bang - GWAR  
CSC 309                | Computer Programming for Scientists and Engineers  
PHYS 360               | Electricity and Magnetism I  
PHYS 370               | Thermodynamics and Statistical Mechanics  | 3  |
| **Units**            |                                                                      | 15   |
| **Third Semester**   |                                                                      |       |
| ASTR 400             | Stellar Astrophysics  
HIST 470 or HIST 471   | The U.S. Constitution to 1877  
PHYS 430               | Quantum Mechanics I  
PHYS 460               | Electricity and Magnetism II  
GE Area UD–B: Upper Division Physical and/or Life Sciences  
or University Elective if UD-B is Already Satisfied | 3  |
| **Units**            |                                                                      | 15   |
| **Fourth Semester**  |                                                                      |       |
| ASTR 470             | Observational Techniques in Astronomy  
ASTR 498 & PHYS 695 or ASTR 697 | Astronomy Research Literature  
RRS 600/HIST 466 or AIS 460 | History of People of Color in the U.S.  
or Senior Project  
or Power and Politics in American Indian History | 3  |
| Major Elective       |                                                                      | 3    |
University Elective | 4
---|---
ASTR 301, ASTR 400, PHYS 320, PHYS 430 and PHYS 460 offered fall semesters only.

Take PHYS 330 if MATH 245 complete.

A course in differential equations and linear algebra is required before taking PHYS 330 and PHYS 385. Students transferring in without an equivalent to MATH 245 must delay taking PHYS 330 and PHYS 385 until the following Fall semester, which will affect other elements of this sample roadmap. Overall time for degree completion will be extended. Students in this situation should consult with a department advisor for an alternate advising plan.

If ENG 214 or equivalent must be completed before enrollment in ASTR 340GW.

Take PHYS 385 if MATH 245 complete.

ASTR 300, ASTR 340GW, ASTR 470, ASTR 697, PHYS 360 and PHYS 370 offered spring semesters only.

PHYS 385 must be taken before PHYS 360.


AIS 460 and HIST 466 satisfy GE: UD-D and US History.

**To Do at SF State:**

Enough total units to reach 120 minimum for graduation; 40 units minimum at the upper division level; to include the following:

**University-Wide Requirements: 9–12 Units**

- ENG 214 or equivalent A4 course if not completed prior to transfer (0–3 units)
- Upper division GE (9 units): If necessary, specific choices can be made to satisfy the US History and Government requirements and UD-C and UD-D at the same time. See notes.
- 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, 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 consent of advisor. Three of the six elective units must be in course(s) numbered 400-499. No more than one unit of a 600-level ASTR course may count towards the electives.

**University Electives: Four 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.