

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

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.

Course	Title	Units
<b>First Semester</b>		
MATH 245 or MATH 376	Elementary Differential Equations and Linear Algebra <sup>1,2</sup> or Ordinary Differential Equations I	3
PHYS 320 & PHYS 321	Modern Physics I and Modern Physics Laboratory <sup>3</sup>	5
US History or University Elective if US History met before transfer		3
Upper Division GE: UD-B, UD-C, or UD-D <sup>4</sup>		3
	Units	14
<b>Second Semester</b>		
PHYS 360	Electricity and Magnetism I <sup>5,6</sup>	3
PHYS 370	Thermodynamics and Statistical Mechanics <sup>5</sup>	3
Major Elective		3
Upper Division GE: UD-B, UD-C, or UD-D		3
University Elective		3
	Units	15
<b>Third Semester</b>		
PHYS 490	Physics Project Laboratory <sup>3</sup>	2
SCI 652	SF State Science Partners in K-12 Schools <sup>3</sup>	4
Major Elective		3
Upper Division GE: UD-B, UD-C, or UD-D		3
U.S. and California Government or University Elective if US/CA Government met before transfer		3
	Units	15
<b>Fourth Semester</b>		
PHYS 491GW	Advanced Laboratory II - GVAR <sup>5</sup>	1
PHYS 695	Culminating Experience in Physics <sup>5</sup>	1
Major Elective – Take Two		6
Upper Division GE: UD-B, UD-C, or UD-D or University Elective		3
University Elective		5
	Units	16
	Total Units	60

- 1 Take PHYS 330 if MATH 245 complete.
- 2 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.*
- 3 PHYS 320/PHYS 321, PHYS 490 and SCI 652 offered fall semesters only.
- 4 Take PHYS 385 if MATH 245 complete.
- 5 PHYS 360, PHYS 370, PHYS 491GW and PHYS 695 offered spring semesters only.
- 6 PHYS 385 must be taken before PHYS 360.

## 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: 9-15 Units

- American Institutions (0-6 units): US History, US Government, California State and Local Government requirements if not taken before transfer
- Upper-division GE, areas B, C and D (9 units): Courses required for the major may double-count if approved for UD GE.
- 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. (Teaching) Major: 37-40 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 1 above)
- Upper-division Requirements (25 units)
- Electives (12 units): May be lower- or upper-division. Selected in consultation with a department advisor; courses should prepare students to teach a second subject in addition to physics, or general science at the 9th-grade level.

### University Electives: Eight 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.