

BACHELOR OF SCIENCE IN PHYSICS: CONCENTRATION IN PHYSICS FOR TEACHING – PHYS ASSOCIATE DEGREE FOR TRANSFER (ADT) 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 (<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 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, and 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: 8 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.

Plan A

Course	Title	Units
First Semester		
Select One (Lower-Division Core): ^{1,2}		3
MATH 245	Elementary Differential Equations and Linear Algebra	
MATH 376	Ordinary Differential Equations I	
PHYS 320 & PHYS 321	Modern Physics I and Modern Physics Laboratory (Upper-Division Core) ³	5
US History (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#USHaGR) or University Elective if US History met before transfer		
Upper Division GE: UD-B, UD-C, or UD-D ⁴		3
		Units
		11
Second Semester		
PHYS 360	Electricity and Magnetism I (Upper-Division Core) ^{5,6}	3

PHYS 370	Thermodynamics and Statistical Mechanics (Upper-Division Core) ⁵	3
Major Elective ⁷		3
Upper Division GE: UD-B, UD-C, or UD-D		3
University Elective		3
Units		15
Third Semester		
PHYS 490	Physics Project Laboratory (Upper-Division Core) ³	2
SCI 652	SF State Science Partners in K-12 Schools (Upper-Division Core) ³	4
Major Elective ⁷		3
Upper Division GE: UD-B, UD-C, or UD-D		3
U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg) or University Elective if US/CA Government met before transfer		3
Units		12
Fourth Semester		
PHYS 491GW	Advanced Laboratory II - GVAR (Upper-Division Core) ⁵	1
PHYS 695	Culminating Experience in Physics (Upper-Division Core) ⁵	1
Major Elective – Take Two ⁷		6
Upper Division GE: UD-B, UD-C, or UD-D or University Elective		3
University Elective		5
Units		16
Total Units		54

- 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.
- ⁷ Selected in consultation with a departmental advisor to prepare to teach a second subject in addition to physics, or general science at the 9th grade level. Electives may be lower-division or upper-division courses.

Plan B			Second Semester	
Course	Title	Units	Select One (Major Lower-Division Prerequisite):	
First Semester			3	
Select One (UD-C, USH, CSLG):		3	MATH 245	Elementary Differential Equations and Linear Algebra
HIST 470	The U.S. Constitution to 1896 (AERM, SJ)		MATH 376	Ordinary Differential Equations I
HIST 471	The U.S. Constitution Since 1896 (AERM, SJ)		GE Area UD-D: Upper-Division Social Sciences	3
Select One:		3	University Elective	3
University Elective (if selecting MATH 245)			Units	
MATH 325	Linear Algebra (if selecting MATH 376)		9	
GE Area UD-B: Upper-Division Physical and/or Life Sciences		3		
Units		9		

Third Semester

PHYS 320 & PHYS 321	Modern Physics I and Modern Physics Laboratory (Major Upper-Division Core)	5
PHYS 330	Analytical Mechanics I (Major Upper- Division Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Upper- Division Core)	3
Units		11

Fourth Semester

PHYS 360	Electricity and Magnetism I (Major Upper-Division Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Upper-Division Core)	3
Major Elective (12 Units Total) - Take Two ¹		6
Units		12

Fifth Semester

PHYS 490	Physics Project Laboratory (Major Upper-Division Core)	2
SCI 652	SF State Science Partners in K-12 Schools (Major Upper-Division Core)	4
Major Elective (12 Units Total) - Take One ¹		3
Units		9

Sixth Semester

PHYS 491GW	Advanced Laboratory II - GVAR (Major Upper-Division Core)	1
PHYS 695	Culminating Experience in Physics (Major Upper-Division Core)	1
Major Elective (12 Units Total) - Take One ¹		3
University Elective - Take Two		5
Units		10
Total Units		60

¹ Selected in consultation with a departmental advisor to prepare to teach a second subject in addition to physics, or general science at the 9th grade level. Electives may be lower-division or upper-division courses.