

# BACHELOR OF SCIENCE IN PHYSICS – 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): If not met before transfer, refer to the next bullet for advice.
- Upper-Division GE (9 units): Courses may satisfy the US History or US/CA Government requirements, and UD-C or UD-D at the same time, if approved for multiple areas.
- 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. 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 or equivalent not completed before transfer).
- Upper-Division Requirements (34 units)
- Upper-Division Electives (10 units): May be units in astronomy, physics, mathematics, or related sciences.

### 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.

#### Plan A

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 (Lower-Division Core): <sup>1,2</sup>		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) <sup>3</sup>	5
GE Area UD-B: Upper Division Physical and/or Life Sciences <sup>4</sup>		3
		<b>Units</b>
		<b>14</b>
<b>Second Semester</b>		
CSC 309	Computer Programming (Upper-Division Core) <sup>5</sup>	3
PHYS 360	Electricity and Magnetism I (Upper-Division Core) <sup>6,7</sup>	3

PHYS 370	Thermodynamics and Statistical Mechanics (Upper-Division Core) <sup>6</sup>	3
Major Elective <sup>8</sup>		3
GE Area UD-D: Upper-Division Social Sciences		3
<b>Units</b>		<b>15</b>
<b>Third Semester</b>		
PHYS 430	Quantum Mechanics I (Upper-Division Core) <sup>3</sup>	3
PHYS 460	Electricity and Magnetism II (Upper-Division Core) <sup>3</sup>	3
PHYS 490	Physics Project Laboratory (Upper-Division Core) <sup>3</sup>	2
Major Elective – Take Two <sup>8</sup>		7
<b>Units</b>		<b>15</b>
<b>Fourth Semester</b>		
PHYS 431	Quantum Mechanics II (Upper-Division Core) <sup>6</sup>	3
PHYS 457	Introduction to Analog Electronics (Upper-Division Core) <sup>6</sup>	4
PHYS 491GW	Advanced Laboratory II - GVAR (Upper-Division Core) <sup>6</sup>	1
PHYS 695	Culminating Experience in Physics (Upper-Division Core) <sup>6</sup>	1
GE Area UD-B: Upper Division Physical and/or Life Sciences or University Elective if UD-B was already satisfied		3
University Elective		4
<b>Units</b>		<b>16</b>
<b>Total Units</b>		<b>60</b>

<sup>1</sup> Take PHYS 330 if MATH 245 complete.

<sup>2</sup> 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 advising plan. Overall time for degree completion will be extended. *Students in this situation should consult with a department advisor for an alternate advising plan.*

<sup>3</sup> PHYS 320/PHYS 321, PHYS 430, PHYS 460 and PHYS 490 are offered fall semesters only.

<sup>4</sup> Take PHYS 385 if MATH 245 complete.

<sup>5</sup> Additional upper-division elective units in astronomy, mathematics, or physics may be substituted for CSC 309 by students proficient in computer programming, subject to approval by the department chair.

<sup>6</sup> PHYS 360, PHYS 370, PHYS 431, PHYS 457 and PHYS 695 offered spring semesters only.

<sup>7</sup> PHYS 385 must be taken before PHYS 360.

<sup>8</sup> **Major Electives (10 units)**

Upper-division astronomy, physics, mathematics, or related sciences courses.

## Plan B

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>		
CSC 309	Computer Programming (Major Upper-Division Core) <sup>1</sup>	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>9</b>
<b>Third Semester</b>		
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
	<b>Units</b>	<b>11</b>
<b>Fourth Semester</b>		
PHYS 360	Electricity and Magnetism I (Major Upper-Division Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Upper-Division Core)	3
Major Elective (10 Units Total) - Take One <sup>2</sup>		3
	<b>Units</b>	<b>9</b>
<b>Fifth Semester</b>		
PHYS 430	Quantum Mechanics I (Major Upper-Division Core)	3
PHYS 460	Electricity and Magnetism II (Major Upper-Division Core)	3
PHYS 490	Physics Project Laboratory (Major Upper-Division Core)	2
Major Elective (10 Units Total) - Take One <sup>2</sup>		3
	<b>Units</b>	<b>11</b>
<b>Sixth Semester</b>		
PHYS 457	Introduction to Analog Electronics (Major Upper-Division Core)	4
PHYS 491GW	Advanced Laboratory II - GVAR (Major Upper-Division Core)	1
PHYS 695	Culminating Experience in Physics (Major Upper-Division Core)	1
Major Elective (10 Units Total) - Take One <sup>2</sup>		4
University Elective		1
	<b>Units</b>	<b>11</b>
	<b>Total Units</b>	<b>60</b>

<sup>1</sup> Additional upper-division elective units in astronomy, mathematics, or physics may be substituted for CSC 309 by students proficient in computer programming, subject to approval by the department chair.

<sup>2</sup> **Major Electives (10 units)**  
Upper-division astronomy, physics, mathematics, or related sciences courses.