PHYSICS BS + MS SF SCHOLARS ROADMAP

The San Francisco State Scholars program provides undergraduate students with an accelerated pathway to a graduate degree. Students in this program pursue a bachelor's and master's degree simultaneously. This program allows students to earn graduate credit while in their junior and/or senior year, reducing the number of semesters required for completion of a master's degree.

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

Course	Title	Units
First Year		
Fall Semester		
ENG 114	Writing the First Year: Finding Your Voice (A2) [1]	3
MATH 226	Calculus I (Major Prerequisite, B4) [2]	4
PHYS 200	Planning for Success as a Physics & Astronomy Major (Major Prerequisite)	1
GE Area A [3]		3
GE Area C		3
GE Area D		3
	Units	**17**
Spring Semester		
MATH 227	Calculus II (Major Prerequisite)	4
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Prerequisite, B1, B3)	4
GE Area A		3
GE Area E		3
	Units	**14**
Second Year		
Fall Semester		
Select One (Major Core):		3
CSC 309	Computer Programming	
MATH 209	Mathematical Computing	
MATH 228	Calculus III (Major Prerequisite)	4
PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Prerequisite)	4
GE Area B: Life Science (B2)		3
	Units	**14**
Spring Semester		
Select One (Major Prerequisite):		3
MATH 225	Introduction to Linear Algebra	
MATH 245	Elementary Differential Equations and Linear Algebra	
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Prerequisite)	4
GE Area C - Take Two		6
GE Area D		3
	Units	**16**
Third Year		
Fall Semester		
PHYS 320	Modern Physics I (Major Core)	3
PHYS 321	Modern Physics Laboratory (Major Core)	2
PHYS 330	Analytical Mechanics I (Major Core)	3
PHYS 385	Introduction to Theoretical Physics I (Major Core)	3
Select One (Major Prerequisite):		
MATH 376	Ordinary Differential Equations I (if MATH 225 taken)	
SF State Studies or University Elective (if MATH 245 taken)		
U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg)		3
	Units	**14**
Spring Semester		
PHYS 360	Electricity and Magnetism I (Major Core)	3
PHYS 370	Thermodynamics and Statistical Mechanics (Major Core)	3
PHYS 457	Introduction to Analog Electronics (Major Core)	4
GE Area F [±]		3

GE Area UD-B: Upper-Division Physical and/or Life Sciences		3
	Units	**16**
Fourth Year		
Fall Semester		
PHYS 430	Quantum Mechanics I (Major Core)	3
PHYS 460	Electricity and Magnetism II (Major Core)	3
PHYS 491GW	Advanced Laboratory Techniques I - GWAR (Major Core)	3
Graduate Core [4,5]		3
GE Area UD-C: Upper-Division Arts and/or Humanities		3
	Units	**15**
Spring Semester		
Graduate Core - Take Two [4,5]		6
Graduate Elective [5,6]		3
GE Area UD-D: Upper-Division Social Sciences		3
SF State Studies or University Elective		2
	Units	**14**
Fifth Year		
Fall Semester		
PHYS 897	Research (Graduate Research)	3
Graduate Core [4]		3
Graduate General Elective [7]		3
	Units	**9**
Spring Semester		
Graduate Elective [6]		3
Graduate General Elective [7]		3
Select One (Culminating Experience):		3
PHYS 895	Culminating Project	
PHYS 896EXM	Culminating Experience Examination (and additional Graduate General Elective)	
PHYS 898	Master's Thesis	
	Units	**9**
	Total Units	**138**

1 ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2 To determine the best B4 course option, students should complete the online advising activity at mathadvising.sfsu.edu (https://mathadvising.sfsu.edu/). Questions? Contact Gator Smart Start. (https://gatorsmartstart.sfsu.edu/)

3 To avoid taking additional units, it is recommended that you meet the **SF State Studies** (AERM, GP, ES, SJ) requirements within your GE or major.

4 **Graduate Core:**
PHYS 704 Electrodynamics (3 units)
PHYS 706 Quantum Mechanics (3 units)
PHYS 775 Statistical Mechanics (3 units)
PHYS 785 Theoretical Physics (3 units)

5 Students can double-count up to 12 units of Graduate Core/Elective courses towards the BS Major Elective requirement.

6 **Graduate Physics and Astronomy Electives (6 units)**
- Select from graduate PHYS and ASTR courses numbered 700 to 799.
- Students interested in theoretical physics are strongly encouraged to take PHYS 701; students interested in experimental physics are strongly encouraged to take PHYS 710.

7 **General Electives (6-9 units)**
Advanced upper-division (numbered 400 and above) or graduate courses (numbered 700 to 885) in physics, astronomy, or appropriately related subjects, selected after advisement and approved by the Graduate Coordinator.
Students who select PHYS 896EXM for their culminating experience must complete 9 units of electives. Students who select PHYS 895PHYS 895 or PHYS 898PHYS 898 for their culminating experience must complete 6 units of electives.
No additional supervision units are allowed. Maximum of 3 units in related fields outside physics & astronomy.
Students who plan to teach as Graduate Teaching Assistants (GTAs) are strongly encouraged to take PHYS 885 (Inclusive Pedagogy for the Physical Sciences).

± Given catalog rights, fall 2023 transfer students do not need to complete an Area F course.