

BACHELOR OF SCIENCE IN PHYSICS: CONCENTRATION IN ASTROPHYSICS ROADMAP

120 Total Units Required

Minimum Number of Units in the Major: 71

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 Semester | | |
| ENG 114 | Writing the First Year: Finding Your Voice (A2) ¹ | 3 |
| MATH 226 | Calculus I (Major Prerequisite, B4) ² | 4 |
| GE Area A ³ | | 3 |
| GE Area C | | 3 |
| GE Area D | | 3 |
| Units | | 16 |
| Second Semester | | |
| CSC 309 | Computer Programming (Major Upper-Division Core) | 3 |
| 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 | | 17 |
| Third Semester | | |
| 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 |
| Select One: | | 3 |
| SF State Studies or University Elective (if selecting MATH 245) | | |
| MATH 325 | Linear Algebra (if selecting MATH 376) | |
| Units | | 14 |

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| Fourth Semester | | |
| ASTR 300 | Stars, Planets, and the Milky Way (Major Upper-Division Core) | 3 |
| Select One (Major Prerequisite): | | 3 |
| MATH 245 | Elementary Differential Equations and Linear Algebra | |
| MATH 376 | Ordinary Differential Equations I | |
| 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 |
| Units | | 16 |

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| Fifth Semester | | |
| ASTR 301 | Observational Astronomy Laboratory (Major Upper-Division Core) | 2 |
| PHYS 320 | Modern Physics I (Major Upper-Division Core) | 3 |
| PHYS 330 | Analytical Mechanics I (Major Upper-Division Core) | 3 |
| PHYS 385 | Introduction to Theoretical Physics I (Major Upper-Division Core) | 3 |
| GE Area D | | 3 |
| Units | | 14 |

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| Sixth Semester | | |
| ASTR 340GW | The Big Bang - GWAR (Major Upper-Division Core) | 3 |
| PHYS 360 | Electricity and Magnetism I (Major Upper-Division Core) | 3 |
| PHYS 370 | Thermodynamics and Statistical Mechanics (Major Upper-Division Core) | 3 |
| GE Area F [±] | | 3 |
| GE Area UD-B: Upper-Division Physical and/or Life Sciences | | 3 |
| Units | | 15 |

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| Seventh Semester | | |
| ASTR 400 | Stellar Astrophysics (Major Upper-Division Core) | 3 |
| PHYS 430 | Quantum Mechanics I (Major Upper-Division Core) | 3 |

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| Major Elective (6 Units Total) – Take One ⁴ | | 3 |
| GE Area UD-D: Upper-Division Social Sciences | | 3 |
| GE Area UD-C: Upper-Division Arts and/or Humanities | | 3 |
| | Units | 15 |
| Eighth Semester | | |
| ASTR 470 | Observational Techniques in Astronomy (Major Upper-Division Core) | 3 |
| Select One (Major Culminating Experience): | | 3 |
| ASTR 498 & PHYS 695 | Astronomy Research Literature and Culminating Experience in Physics | |
| ASTR 697 | Senior Project | |
| Major Elective (6 Units Total) – Take One ⁴ | | 3 |
| U.S. and California Government (http://bulletin.sfsu.edu/undergraduate-education/american-institutions/#usg) | | 4 |
| | Units | 13 |
| | Total Units | 120 |

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 **Major Electives (6 units)**

Chosen from upper-division courses in Physics or Astronomy with consent of an advisor. Three of the 6 units must be in a course(s) numbered 400–499. Up to 1 unit of a 600 level course in ASTR may count toward this requirement. If MATH 325 was taken, those units can be applied to this requirement.

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