



**SAN FRANCISCO
STATE UNIVERSITY**

COLLEGE OF SCIENCE & ENGINEERING
DEPARTMENT OF PHYSICS & ASTRONOMY
1600 HOLLOWAY AVENUE
SAN FRANCISCO, CA 94132

Advising Supplement for Undergraduate Physics & Astronomy Spring 2022

Welcome to the Department of Physics & Astronomy within the College of Science & Engineering (CoSE) at San Francisco State University (SFSU)! We are an inclusive department where all students are welcome to study the cosmos!

The Spring 2022 semester will be a transitional semester; we anticipate that almost all classes will be back to in-person, on-campus teaching in Spring 2022. Some required classes will not be offered in 2021-2022, and so we are authorizing substitutions so that students can still make steady progress toward their degrees.

All physics & astronomy majors are required to get major advising with their faculty advisors in Fall 2021. Students will be blocked from registering for classes in Spring 2022 until they get this advising.

Please contact the Department Chair Prof. Joseph Barranco (barranco@sfsu.edu) or the Associate Chair Prof. Adrienne Cool (cool@sfsu.edu) to get substitutions, updates and corrections made to your Degree Progress Report (DPR).

Courses that WILL be offered in Spring 2022:

ASTR 115/116, 300, 405, 685, 770

PHYS 220/222, 230/232, 240/242, 321, 325, 360, 370, 440/740, 490/491, 704, 706

Courses that WILL NOT be offered in either Fall 2021 or Spring 2022:

ASTR 340, 470, 498/798, 722, 742

PHYS 431, 450, 457, 460, 695, 710, 712, 715, 725, 726, 730, 775

The department maintains a list of courses in other departments that can count as major electives for physics and astronomy degrees. See: <http://www.physics.sfsu.edu/Academics/Courses.html>

Advice for specific degrees follows.

**B.S. Physics, B.A. Physics, &
B.S. Physics (Concentration in Physics for Teaching)**

- First-year and sophomores should continue through the calculus sequence (**MATH 226, 227, 228**) and the introductory physics sequence (**PHYS 220/222, 230/232, 240/242**).
- Sophomores should take **MATH 245** (Differential Equations & Linear Algebra) in Spring 2022 or Summer 2022. If a student is also completing a Minor in Mathematics, they should instead take **MATH 325** (Linear Algebra) in Spring 2022 or Summer 2022, and then take **MATH 376** (Differential Equations) in Fall 2022.
- All physics majors should take **CSC 309** (Computer Programming) as soon as possible; the ideal time is spring of sophomore year. Please do not delay taking computer programming because it may be used in upper-division courses. (**CSC 309** is technically only required for the B.S. Physics degree, but it is strongly recommended for all students.)
- In Spring 2022, all junior and senior physics majors should enroll in **PHYS 321** (Modern Physics Lab). This upper-division lab course is usually offered in fall semesters, but had not been offered in F20 or F21 because of COVID. We will offer 3 sections of **PHYS 321** in Spring 2022 so that all students will have an opportunity to take this intermediate lab before they graduate. (Seniors will actually be switched over to **PHYS 490/491** in the first week of the semester so that they can satisfy the GVAR requirement. See next item.)
- **PHYS 490** (Physics Project Lab, 2 units) and **PHYS 491** (Advanced Lab, 1 unit) will be offered for seniors so that they may satisfy the GVAR requirement. **PHYS 490/491** will actually cover the same labs as **PHYS 321**, so please enroll in **PHYS 321**. We will switch seniors over to **PHYS 490/491** in the first week of the semester. Seniors will still need to choose an elective to take the place of **PHYS 321**.
- Juniors should also enroll in **PHYS 360** (Electromagnetism I) which will be offered on campus.
- **PHYS 370** (Thermodynamics & Statistical Physics) will be offered as an asynchronous online course in Spring 2022. Juniors can take this course in Spring 2022, or delay until Spring 2023. Seniors who have not yet taken **PHYS 370** must take it in Spring 2022.
- **PHYS 457** (Analog Electronics, 4 units) will not be offered in Spring 2022. Students can instead substitute **ENGR 205 & 206** in Spring 2022 (or Summer 2022 or Fall 2022). We are not yet sure if **PHYS 457** will return in Spring 2023. (**PHYS 457** is only required for the B.S. Physics degree. Other students who take **ENGR 205 & 206** can count these courses as upper-division electives despite the fact they are numbered less than 300.)
- **PHYS 695** (1 unit) will not be offered in Spring 2022. Seniors will need to substitute 1 unit of additional electives.
- Electives for juniors and seniors that will be offered include: **PHYS 325** (Modern Physics II), which will be offered on-campus, and **PHYS 440** (Computational Physics) which will be offered online. Physics majors may also consider **ASTR 300** (Stars, Planets, and the Milky Way) and **ASTR 405** (Exoplanetary Science), both of which will be offered on-campus. Under the supervision of a faculty member, students may also consider doing a senior project (**PHYS 697**) or independent study (**PHYS 699**).
- Physics students may also consider electives in math, engineering, or other related fields. Seniors with 3.3+ GPAs in upper-division coursework may also consider graduate courses numbered 700 or greater, such as **PHYS 704** (Electromagnetism) or **PHYS 706** (Quantum Mechanics). If an undergraduate student takes graduate courses and does not actually need them to complete requirements for their undergraduate degree, they can later transfer the courses to a Master's degree. This is a great way to get a jump-start on a graduate degree!
- For the B.S. Physics (Concentration in Physics for Teaching), **SCI 652** is no longer being offered. **EED 655** may be substituted. Other substitutions may be possible – discuss with Prof. Adrienne Cool.

B.S. Physics, Concentration in Astrophysics &

B.A. Physics, Concentration in Astronomy

- First-year/sophomores should continue through the calculus sequence (**MATH 226, 227, 228**) and the introductory physics sequence (**PHYS 220/222, 230/232, 240/242**). **ASTR 115** (Introduction to Astronomy) is encouraged as early as possible (not required for B.S. Astrophysics, but still encouraged).
- Sophomores should take **MATH 245** (Differential Equations & Linear Algebra) in Spring 2022 or Summer 2022. If a student is also completing a Minor in Mathematics, they should instead take **MATH 325** (Linear Algebra) in Spring 2022 or Summer 2022, and then take **MATH 376** (Differential Equations) in Fall 2022. (**MATH 245** is not required for B.A. degree, but is still strongly encouraged.)
- All astronomy/astrophysics majors should take **CSC 309** (Computer Programming) as soon as possible; the ideal time is spring of sophomore year. Please do not delay taking computer programming because it will be used in upper-division courses. (Although **CSC 309** is not required for B.A. degrees, it is still strongly encouraged.)
- Juniors should enroll in **ASTR 300** (Stars, Planets, and the Milky Way). For sophomores to take this course, they must have completed at least 2 of the 3 introductory physics courses and should at least be co-enrolled in the third course.
- B.A. Astronomy seniors are required to enroll in **PHYS 321** (Modern Physics Lab) in Spring 2022. See above in the Physics section for details. B.A. Astronomy juniors may also enroll in **PHYS 321** in Spring 2022 or wait until Fall 2022. **PHYS 321** is not required of B.S. Astrophysics majors, though it may be taken as an elective in the major. However, B.S. Astrophysics seniors who need to satisfy the GWAR requirement before they graduate should also enroll in **PHYS 321** in Spring 2022. See the note below for **ASTR 340**.
- **ASTR 340** (The Big Bang) will not be offered in Spring 2022, but will return in Spring 2023. Juniors can wait until next year to take this course. Seniors who are graduating in May or December 2022 and have not yet taken **ASTR 340** should instead enroll in **PHYS 321** (you will be switched into **PHYS 490/491**) so that they may satisfy the GWAR requirement. See above in the Physics section for more details. Alternatively, you may enroll in another department's GWAR course if you satisfy the prerequisites or have the instructor's permission.
- Juniors doing the B.S. degree should also enroll in **PHYS 360** (Electromagnetism I) which will be offered on campus. **PHYS 370** (Thermodynamics & Statistical Physics) will be offered as an asynchronous online course in Spring 2022. Juniors doing the B.S. degree can take this course in Spring 2022, or delay until Spring 2023. Seniors who have not yet taken **PHYS 370** must take it in Spring 2022 to complete the B.S. degree.
- **ASTR 470** (Observational Techniques) is not being offered this year, but will be offered in Spring 2023. Seniors who plan to graduate in May or December 2022 but have not yet taken **ASTR 470** may substitute another upper-division physics or astronomy course.
- B.S. Astrophysics students should enroll in **ASTR 697**: Senior Project after finding a professor to supervise a project, or may instead elect to take another upper-division elective.
- Electives for juniors and seniors that will be offered include: **ASTR 405** (Exoplanetary Science), which will be offered on-campus, **PHYS 325** (Modern Physics II), which will be offered on-campus, and **PHYS 440** (Computational Physics) which will be offered online. Astronomy students who have completed **ASTR 301** or received appropriate training may also earn credit via **ASTR 685** (Projects in Teaching Astronomy) for being observatory docents who help with public outreach and "star parties" with our roof-top observatory. Under the supervision of a faculty member, students may also consider doing independent study (**ASTR 699**).
- Seniors may also consider electives in math, engineering, or other related fields. Seniors with 3.3+ GPAs in upper-division coursework may also consider graduate courses numbered 700 or greater, such as **ASTR 770** (Observational Techniques), **PHYS 704** (Electromagnetism) or **PHYS 706** (Quantum Mechanics). If an undergraduate student takes graduate courses and does not actually need them to complete requirements for their undergraduate degree, they can later transfer the courses to a Master's degree. This is a great way to get a jump-start on a graduate degree!