

Department of Astronomy

University of Massachusetts, Amherst

Requirements for Astronomy B.S. Degree - Space Science Track (Student starting Fall 2023 and later)

Recommended for students pursuing an astronomy-related professional career after graduation. Majors in this track must develop a plan to complete course requirements with their advisor.

The requirements listed below are the Department major requirements only. In addition, to graduate you will need to satisfy the University General Education requirements and the College requirement of 60 credits in College courses. Two of the general education requirements (Junior Year Writing and Integrative Experience) are discipline specific and are summarized below.

Astronomy Courses:

ASTRON 191A: First Year Seminar (1 cr., Fall semester only)

ASTRON 228: Astrophysics I: Stars and Galaxies (3 cr., Spring semester only)

JUNIOR YEAR WRITING: Students whose primary major is astronomy should take

ASTRON 301: Writing in Astronomy (3 credits, Fall semester only) to satisfy the Junior Year Writing requirement. Students whose primary major is not astronomy, only need take the junior year writing course offered in their primary major.

Either **ASTRON 335:** Astrophysics II: Stellar Structure and Evolution (4 cr., Fall semester) or **ASTRON 452:** Astrophysics III: Galaxies and the Universe (4 cr., Spring semester)

INTEGRATIVE EXPERIENCE: Students whose primary major is astronomy can take either **ASTRON 339:** Astronomy in a Global Context (3 credits, Spring semester only) or **PHYSICS 440:** Intermediate Lab (4 credits, Fall and Spring semesters) to satisfy the Integrative Experience requirement. Students whose primary major is not astronomy, only need to take the integrative experience course offered in their primary major.

Three additional Astronomy courses (each at least 3 credits), two at the 200 level or higher and one at the 300 level or higher (independent study, practicum, honors project, honors thesis and honors research do not satisfy this requirement). Astron 339 cannot satisfy this requirement if used to satisfy the IE requirement.

Some options for 200+ and 300+ Astronomy courses:

ASTRON 220: Special Topics in Astronomy (3 cr.)

ASTRON 223: Planetary Science (3 cr.)

ASTRON 226: Cosmology (3 cr.)

ASTRON 330: Topics in Astrophysics (3 cr.)

ASTRON 337: Techniques of Optical and Infrared Astronomy (4 cr., Fall semester)

Although not required, we encourage students to get involved in research and take an independent study course.

Physics Courses:

PHYSICS 181: Physics I: Mechanics (4 cr., Fall semester only)

PHYSICS 182 : Physics II: Electricity and Magnetics (4 cr., Spring semester only)

PHYSICS 271: Mathematical Methods of Physics I (3 cr., Fall semester only)

PHYSICS 272: Physics III: Thermodynamics, Optics and Special Relativity (3 cr., Fall semester only) and **PHYSICS 273:** Sophomore Lab I (2 cr., Fall semester only)

PHYSICS 276: Physics IV: Introduction to Waves and Quantum Mechanics (3 cr., Spring semester only) and **PHYSICS 277:** Sophomore Lab II (2 cr., Spring semester only)

PHYSICS 281: Computational Physics (3 cr., both semesters)

One additional (at least 3-credits) 400+ level course in Physics

Math Courses:

MATH 131: Calculus I (4 cr., both semesters)

MATH 132: Calculus II (4 cr., both semesters)

MATH 233: Multivariate Calculus (3 cr., both semesters)

Concentration Requirement:

Three courses (at least 3 credits each) in a related field agreed to by the student's Department Advisor. The courses used to satisfy the concentration requirement cannot be used to satisfy any of the requirements listed above.

Suggested Course Schedule:

Freshman Year: **Fall: ASTRON 191A, PHYS 181, MATH 131**
 Spring: ASTRON 228, PHYS 182, MATH 132

Sophomore Year: **Fall: PHYS 271, PHYS 272/273, MATH 233**
 Spring: PHYS 276/277, PHYSIC 281
 Fall or Spring: Elective 200+ level astronomy, Concentration courses

Junior/Senior Years: **Fall: ASTRON 301, ASTRON 335**
 Spring: ASTRON 339
 Fall or Spring: 400+ level physics course, remaining 200+ and 300+ astronomy electives and Concentration courses