

# Department of Astronomy

University of Massachusetts, Amherst

## Requirements for B.S. Degree in Astronomy - Astrophysics Track (Students starting Fall 2023 and later)

This track is recommended for students who want to eventually pursue a Ph.D. degree in astrophysics or in a related field.

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 courses in the College. 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.

**ASTRON 335:** Astrophysics II: Stellar Structure and Evolution (4 cr., Fall semester only)

**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.

**ASTRON 452:** Astrophysics III: Galaxies and the Universe (4 cr., Spring semester only)

**One additional course at the 300+ level** (at least 3 credits) (independent study, practicum, honors project, honors thesis and honors research do not satisfy this requirement). Astron 339 cannot be used to satisfy this requirement if used to satisfy the IE requirement.

Recommendations:

**ASTRON 330:** Topics in Astrophysics (3 cr.)

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

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

## ***Physics Courses:***

**PHYSICS 181 (4 credits with lab):** Physics I: Mechanics (4 cr., Fall semester only)

**PHYSICS 182 (4 credits with lab):** Physics II: Electricity and Magnetism (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 275:** Mathematical Methods of Physics II (3 cr., Spring 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)

**PHYSICS 421:** Mechanics I (4 cr., Fall semester only)

**PHYSICS 422:** Intermediate Electricity and Magnetism (4 cr., Spring semester only)

**PHYSICS 423:** Statistical Physics (4 cr., Spring semester only)

**PHYSICS 424:** Quantum Mechanics (4 cr., Fall semester only)

## ***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)

## **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 275, PHYS 276/277, PHYS 281**

**Junior/Senior Years:** **Fall: ASTRON 301, ASTRON 335, PHYS 421, PHYS 424**  
                                 **Spring: ASTRON 339, ASTRON 452, PHYS 422, PHYS 423**  
                                 **Fall or Spring: Astronomy 300+ Elective**