Astrophysics Major  
2013–2014

The program develops the skills necessary to tackle complex problems within the physical sciences. The astrophysics program prepares students for careers in several areas, including graduate studies in astrophysics, earth science, or other physical sciences; secondary education in the physical sciences; science policy; and science and technical writing.

In addition to the core math, physics, and astrophysics requirements, the astrophysics major requires elective credits that may be used to explore an area of specialization. Examples of areas of specialization include secondary education, science writing, science policy, and research. For example, a student pursuing secondary education in the physical sciences may take additional chemistry and history courses to satisfy entrance requirements to the College of Education and Human Development, whereas a student pursuing a graduate degree may take additional physics courses. Consult your major program adviser.

**Degree Requirements**

Math 1271 and 1272 or Math 1371 and 1372 or Math 1571 and 1572 (8–10 cr)—Calculus I and II
Math 2243 and 2263 or Math 2373 and 2374 or Math 2573 and 2574 (8 cr)—linear algebra and differential equations, multivariable calculus
Math 3283W—Sequences, Series, and Foundations, or other major-adviser-approved 3xxx Math course (4 cr)

Phys 1301W, 1302W, and 2503 or Phys 1401V, 1402V, and 2403H (12 cr)—Introductory Physics
Phys 2201—Introductory Thermal and Statistical Physics (3 cr)
Phys 2601—Quantum Physics (4 cr)
Phys 2605—Quantum Physics Laboratory (3 cr)
Phys 4001—Analytical Mechanics (4 cr)
Phys 4002—Electricity and Magnetism (4 cr)

Ast 1001 or 1011H—Exploring the Universe (Honors is recommended), recommended but not required
Ast 2001—Introduction to Astrophysics (4 cr)
Ast 4001—Astrophysics I (4 cr) (or other Ast course numbered at 4xxx or above)
Ast 4002—Astrophysics II (4 cr) (or other Ast course numbered at 4xxx or above)

Area of specialization, approved by major adviser (at least 12 cr)

Ast 4994W—Directed Research (3 cr minimum). This requirement can be met with directed research in astronomy or a project more tailored to the specific track within the degree program. For example, students pursuing a career in secondary education may want to develop a unit on astronomy for junior high school instruction instead of an astronomy research project.

How to declare the Astrophysics major:

Contact the Astronomy department in 356 Physics, 612-624-2011, to schedule an appointment to meet with the Astronomy adviser to declare the major. You should bring a copy of your APAS to this appointment. Consult with your college adviser if you have any questions.
Resources

The Department of Astronomy’s website (http://www.astro.umn.edu/) contains information about the undergraduate program, including sample course plans for different areas of specialization.

Possible Areas of Employment

- **Science**—observatory and laboratory positions, computer programming, physicists
- **Government**—public information, campaigns, federal offices
- **Museums**—science museums, planetariums
- **Business**—marketing, human resources, sales, consulting, recruiting
- **Education**—teaching, research

CLA Career Services

The CLA Career Services located in 411 Science Teaching and Student Services (STSS), supports CLA students making career and major decisions. Their phone number is 612-624-7577 and their website is www.clacareer.umn.edu.

**Hours:** The office’s Resource Library is open from 8:00am–4:30pm Monday–Friday, and no appointment is necessary for students who wish to use the resources listed in this handout. For students with additional questions after their initial visit, appointments are available with professional staff members to discuss career planning. The staff in the Resource Library will help you schedule an appointment.

**Workshops and Classes:** CLA Career Services offers career workshops and credit-bearing courses covering résumé writing, job and internship searches, interviewing, and other subjects. A current schedule is available online at www.clacareer.umn.edu.

**Graduate and Professional School Information:** CLA Career Services Resource Library includes information on graduate and professional schools. Students visiting the office can learn more about potential programs and application procedures. In addition, CLA Career Services staff members are available to review drafts of personal statements for students applying to graduate programs. While CLA Career Services staff can’t substitute for the Writing Center or others who are experts in grammar and other intricacies of writing essays, they will be happy to offer feedback. See a CLA Career Services peer adviser in 411 STSS to schedule an appointment. Finally, CLA Career Services coordinates an annual Graduate and Professional School Day, attended by representatives from programs across the United States.

**Volunteer Resources:** Many science students are interested in gaining volunteer experience. The Community Service-Learning Center can help with this. Community Service-Learning Center is in 240 Appleby, advisers are available to meet with students who wish to arrange volunteer opportunities or who wish to enroll in classes that involve service-learning. For more information, see www.servicelearning.umn.edu or call 612-624-2044.

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Resources Available at the CLA Career Services – 411 STSS

150 Best Companies for Liberal Arts Graduates by Woodruff and Ptacek
Careers for Geniuses & Other Gifted Types by Jan Goldberg
Careers in High Tech by Nick Basta
Careers in Science by Thomas A Easton
Great Jobs for Liberal Arts Majors by Blythe Camenson
Opportunities in High Tech Careers by Yanuck and Golter
Real People Working in Science by Jan Goldberg

Web Sites of Interest:

University of Minnesota Department of Astronomy  http://www.astro.umn.edu/
NASA/IPAC Intergalactic Database  http://nedwww.ipac.caltech.edu/
Minnesota Planetarium  http://www.mplanetarium.org/planet_home.html
American Institute of Physics  http://www.aip.org/
American Physical Society  http://www.aps.org/
APS Careers in Physics  http://www.aps.org/jobs/
American Institute of Physics – Education and Student Services  http://www.aip.org/education.html
Science Careers  http://recruit.sciencemag.org/
Physics Today Job board  http://www.physicstoday.org/jobs/
Physics Jobs Online  http://physicsweb.org/TIPTOP/FORUM/JOBS/
Science Jobs  http://recruit.sciencemag.org
Association of Science-Technology Centers - job listings  http://www.astc.org/profdev/jobs/jobs.htm
Jobs in Physics, Astronomy, and Engineering  http://www.physlink.com/Community/JobBoard.cfm

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