

ASTRONOMY- PHYSICS, BS

ADVISING AND CAREERS

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We encourage students to meet major advisors as early as possible. The undergraduate advisor, Evan Heintz (via Starfish), can assist students with curriculum and course scheduling, career planning, academic concerns, and overall performance and strategies.

To declare the astronomy-physics major, **first** meet with the Undergraduate Advisor, Evan Heintz (eheintz@wisc.edu), who will then put you in contact with the Faculty Advisors: Professor Ke Zhang (ke.zhang@wisc.edu (townsend@astro.wisc.edu)) or Professor Snezana Stanimirovic, (sstanimi@astro.wisc.edu).

ADVISING FOR SOAR STUDENTS

Email eheintz@wisc.edu if you have any questions. You may also use Starfish to schedule an appointment with him.

The Department of Astronomy encourages our majors to begin working on their career exploration and preparation soon after arriving on campus. We partner with SuccessWorks at the College of Letters & Science. L&S graduates are in high demand by employers and graduate programs. It is important to us that our students are career ready at the time of graduation, and we are committed to your success.

A good starting point to begin exploring possible careers is to enroll in PHYSICS 301 Physics Today. This course, offered in the spring semester, includes a weekly talk where a topic of local research is discussed by one of the physics faculty, astronomy faculty, or SuccessWorks.

RECOMMENDED ADDITIONAL COURSES

ASTRONOMY

It is recommended that students take ASTRON 200 at some point during the introductory physics sequence. This course serves as a good introductory basis for all areas of astronomy and will serve you well in your upper-level coursework. ASTRON 103/ASTRON 104 are not recommended for students planning to major in Astronomy-Physics.

MATHEMATICS

Specific math courses are listed as prerequisites for your Physics and Astronomy courses. We also recommend a few other math courses to best prepare you for your upper-level coursework.

MATH 221 Calculus and Analytic Geometry 1: A prerequisite for ASTRON 200, PHYSICS 247, PHYSICS 207, and PHYSICS 201.

MATH 222 Calculus and Analytic Geometry 2: A prerequisite for PHYSICS 247 but can be taken concurrently.

MATH 234 Calculus--Functions of Several Variables: A prerequisite for PHYSICS 248 but can be taken concurrently. If you are not taking the PHYSICS 247/PHYSICS 248/PHYSICS 249 intro sequence, you will still need this course for PHYSICS 311 and PHYSICS 322.

MATH 319 Techniques in Ordinary Differential Equations: Techniques for solving and approximating solutions to ordinary differential equations.

MATH 340 Elementary Matrix and Linear Algebra: An introduction to linear algebra. This course is a bridge between concrete and abstract math. You are strongly advised to take MATH 319 and MATH 340, or MATH 320 before PHYSICS 311 and PHYSICS 322.

MATH 320 Linear Algebra and Differential Equations: This course combines topics from MATH 319 and MATH 340. It is adequate for the rest of the undergraduate curriculum but is not recommended for students planning to continue to graduate school. There is an accelerated honors section that thoroughly covers all of the material in MATH 319 and MATH 340. It is more challenging but is a good way to fit in both topics if you are unable to take MATH 319/MATH 340 before you take PHYSICS 311 or PHYSICS 322.

MATH 321 Applied Mathematical Analysis: Techniques for solving problems in the physical sciences, engineering, and applied mathematics, using advanced calculus and analytic function theory. For students interested in more abstract math, taking MATH 521 would be equivalent. It is recommended that MATH 321 be taken before PHYSICS 322 but especially before you take either PHYSICS 448 /PHYSICS 531. Note that this course is a significant time commitment.

A typical math sequence is: MATH 221, MATH 222, MATH 234, MATH 319, MATH 340, MATH 321.

Please consult with an advisor when choosing your Mathematics courses. We do not recommend the honors sequence (MATH 375/MATH 376) unless you are considering majoring in Math as well.

COMPUTER AND DATA SCIENCE

Computers are fundamental to astronomical research. The most useful languages are Python followed by C or C++. The computer sciences department offers introductory courses. The Division of Information Technology (DoIT) also offers short courses to introduce programming.

COMP SCI 220 Data Science Programming I is a good starting point since Python is a commonly used language in Astronomy research. Students may then wish to continue to COMP SCI 320 Data Science Programming II.

Students interested in data science and machine learning are also recommended to take PHYSICS 361 Machine Learning in Physics.

CHEMISTRY

A college course in physical or organic chemistry is useful for astronomy students. Physical chemistry is particularly valuable for those interested in the interstellar medium, comets, and planets.

STATISTICS

A background in statistics is valuable, particularly for students interested in observational astronomy. STAT/MATH 309 Introduction to Probability and Mathematical Statistics I/STAT/MATH 310 Introduction to Probability and Mathematical Statistics II are suggested.

L&S CAREER RESOURCES

Every L&S major opens a world of possibilities. SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps students turn the academic skills learned in their major, certificates, and other coursework into fulfilling lives after graduation, whether that means jobs, public service, graduate school or other career pursuits.

In addition to providing basic support like resume reviews and interview practice, SuccessWorks offers ways to explore interests and build career skills from their very first semester/term at UW all the way through graduation and beyond.

Students can explore careers in one-on-one advising, try out different career paths, complete internships, prepare for the job search and/or graduate school applications, and connect with supportive alumni and even employers in the fields that inspire them.

- SuccessWorks (<https://careers.ls.wisc.edu/>)
- Set up a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Enroll in a Career Course (<https://successworks.wisc.edu/career-courses/>) - a great idea for first- and second-year students:
 - INTER-LS 210 L&S Career Development: Taking Initiative (1 credit)
 - INTER-LS 215 Communicating About Careers (3 credits, fulfills Comm B General Education Requirement)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)
 - INTER-LS 260 Internship in the Liberal Arts and Sciences
- Activate your Handshake account (<https://successworks.wisc.edu/handshake/>) to apply for jobs and internships from 200,000+ employers recruiting UW-Madison students
- Learn about the impact SuccessWorks has on students' lives (<https://successworks.wisc.edu/about/mission/>)