

# PHYSICS, BS

## ADVISING AND CAREERS

### ADVISING AND CAREERS DECLARE OR CANCEL THE MAJOR

Follow the process described in the Department of Physics website (<https://physics.wisc.edu/undergraduate/>).

Talk with a Physics advisor: send an email to [physics-advisors@wisc.edu](mailto:physics-advisors@wisc.edu) or schedule an appointment through Starfish.

### ADVISING FOR ADMITTED STUDENTS

Contact the undergraduate advisor for assistance choosing first-semester courses before enrolling at Student Orientation, Advising, and Registration (SOAR (<https://soar.wisc.edu/>)).

### UNDERGRADUATE RESEARCH

If you are declared in the Physics major and are interested in pursuing a research position with a faculty member or scientist, please schedule an appointment through Starfish with the undergraduate advisor, who will discuss your interests and help you in finding a position.

### CAREER EXPLORATION

A good starting point for exploring careers is PHYSICS 301 Physics Today. This course, offered in Spring semesters, includes a weekly talk where a research topic is discussed by one of the Physics or Astronomy faculty.

SuccessWorks has also created the extremely helpful Physics-specific "What Can You Do with Your Major" (<https://successworks.wisc.edu/what-you-can-do-with-your-major/>) Skills & Outcomes Sheet. Explore the major's transferable skills, alumni job titles, frequent employers of the major, and words of advice from alumni who have found success following their passions.

The Department of Physics website has a current list of research opportunities (<https://www.physics.wisc.edu/undergraduate/student-resources/#research-opportunities>) with our faculty, and other physics-related student jobs (<https://www.physics.wisc.edu/undergraduate/student-resources/#other-job-opportunities>) on campus.

### TUTORING IN THE PHYSICS LEARNING CENTER

The Physics Learning Center has job opportunities for Physics undergraduates as peer mentor tutors, to help others learn physics and new ways to solve physics problems. Peer mentor tutors lead a learning team twice a week helping students build a conceptual framework to solve a variety of physics problems. The Physics Learning Center strives to create a supportive learning environment to help students gain skills, increase confidence, and meet potential study partners. Learn more about the PLC Peer Mentor Tutor Program (<https://plc.physics.wisc.edu/join-us/>).

### Physics Learning Center

2337/2338 Chamberlin Hall, 1150 University Ave.

## RECOMMENDED ADDITIONAL COURSES

### MATHEMATICS

Please consult with a Physics advisor before choosing your Mathematics courses.

Specific Mathematics courses are prerequisites for the major's Physics courses. A typical math sequence is: MATH 221 Calculus and Analytic Geometry 1, MATH 222 Calculus and Analytic Geometry 2, MATH 234 Calculus--Functions of Several Variables, MATH 319 Techniques in Ordinary Differential Equations, MATH 340 Elementary Matrix and Linear Algebra, MATH 321 Applied Mathematical Analysis 1: Vector and Complex Calculus, and MATH 322 Applied Mathematical Analysis 2: Partial Differential Equations. MATH 320 Linear Algebra and Differential Equations is an alternative course that Physics students may choose instead of taking both MATH 319 Techniques in Ordinary Differential Equations and MATH 340 Elementary Matrix and Linear Algebra.

Students also majoring in Mathematics may have a different recommended set. We do not recommend the MATH honors sequences for Physics students unless you are considering a second major in Mathematics.

- MATH 221 Calculus and Analytic Geometry 1: A prerequisite for PHYSICS 247 A Modern Introduction to Physics, PHYSICS 207 General Physics, and PHYSICS 201 General Physics.
- MATH 222 Calculus and Analytic Geometry 2: A prerequisite for PHYSICS 247 A Modern Introduction to Physics but can be taken concurrently.
- MATH 234 Calculus--Functions of Several Variables: MATH 234 Calculus--Functions of Several Variables is a prerequisite for PHYSICS 248 A Modern Introduction to Physics but can be taken concurrently. If you are not taking the PHYSICS 247 A Modern Introduction to Physics + PHYSICS 248 A Modern Introduction to Physics + PHYSICS 249 A Modern Introduction to Physics introductory sequence, you will still need this course for PHYSICS 311 Mechanics and PHYSICS 322 Electromagnetic Fields.
- MATH 319 Techniques in Ordinary Differential Equations and MATH 340 Elementary Matrix and Linear Algebra: You are strongly advised to take these courses before you take PHYSICS 311 Mechanics and PHYSICS 322 Electromagnetic Fields.
- MATH 320 Linear Algebra and Differential Equations: This course combines topics from MATH 319 and MATH 340. It is adequate for the rest of our undergraduate physics curriculum but is not recommended for those planning for 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 1: Vector and Complex Calculus: For students interested in more abstract math, taking MATH 521 Analysis I would be equivalent. It is recommended that MATH 321 be taken before PHYSICS 322 Electromagnetic Fields but especially before you take either PHYSICS 448 Atomic and

Quantum Physics or PHYSICS 531 Introduction to Quantum Mechanics. Students may want to check with the academic advisor before enrolling in this course to confirm they have enough time and attention in a specific term. Students pursuing a Math major may prefer to take MATH 521 Analysis I and to take MATH 623 Complex Analysis later to still be introduced to complex analysis.

- MATH 322 Applied Mathematical Analysis 2: Partial Differential Equations: MATH 321 and MATH 322 are recommended for those planning for graduate school in Physics. Students pursuing a Math major may prefer to take MATH 619 Analysis of Partial Differential Equations for learning partial differential equations.

## Computer and Data Science

Computers are fundamental to astronomical research. The most useful language is Python, followed by C or C++. COMP SCI 220 Data Science Programming I is a good starting point for learning Python.

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

## Chemistry

A college course in chemistry is useful for all Physics students, but not required.

## STUDY ABROAD

Learning in Letters & Science emphasizes discovery, growth, understanding different perspectives, and challenging yourself, which makes studying abroad an excellent fit for many L&S students: [studyabroad.wisc.edu](https://studyabroad.wisc.edu) (<https://studyabroad.wisc.edu/>)

As a university with global influence, we have more than 300 study abroad programs (<https://studyabroad.wisc.edu/programs/>) in over 80 countries. These vary in length, academic focus, teaching format, language requirements, cost, and level of independence. There are many programs to complement every major (<https://studyabroad.wisc.edu/academics/major-advising-pages-maps/#L&S>) and any year of college (including the final semester)—and all meet UW–Madison’s high academic standards. Students admitted into Letters & Science can even choose a short program in the summer before they start college or their whole first year: [studyabroad.wisc.edu/launch](http://studyabroad.wisc.edu/launch/) (<http://studyabroad.wisc.edu/launch/>). Talk with your academic advisor about how studying abroad might fit with your academic plan.

## SUCCESSWORKS

SuccessWorks (<https://successworks.wisc.edu/>) at the College of Letters & Science helps you turn the academic skills learned in your classes into a fulfilling life, guiding you every step of the way to securing jobs, internships, or admission to graduate school.

Through one-on-one career advising, events, and resources, you can explore career options, build valuable internship and research experience, and connect with supportive alumni and employers who open doors of opportunity.

- What you can do with your major (<https://successworks.wisc.edu/what-you-can-do-with-your-major/>) (Major Skills & Outcomes Sheets)
- Make a career advising appointment (<https://successworks.wisc.edu/make-an-appointment/>)
- Learn about internships and internship funding (<https://successworks.wisc.edu/finding-a-job-or-internship/>)

- Try “Jobs, Internships, & How to Get Them,” (<https://successworks.wisc.edu/canvas/>) an interactive guide in Canvas for enrolled UW–Madison students