If you really want to major in physics, and you put in the work to build your skill and knowledge base, you will be able to get a physics degree. We recognize that some of you may not have had the same opportunities in high school, and for that reason we offer three different levels of a first course in physics. We find everyone catches up by the second year. There are many resources on campus to help you fill in any holes in your background - it is your responsibility to take advantage of these. We are large, and it is possible to slip through the cracks. If you ask for help, however, we can and will help you.
Physics is the exploration of how matter behaves and interacts - from the smallest subatomic particles to the formation of galaxy clusters. It also underlies many of the technologies that enable modern society. Physicists invented the web to stay connected and share data in international collaborations; your iPod depends on quantum mechanics and transparent conductors; the transformation of energy among its different forms and the manipulation of light and other forms of radiation are all core to physics. Physics is a living, breathing field making new discoveries every day. Undergraduates in our department last year worked on research ranging from applying machine learning to discovering new particles at the atom smasher in Geneva to modelling galaxy formation; from making superconductors that are two atomic layers thick to designing xray spectrometers; from measuring the kinetics of biological enzymes to developing prosthetics at the VA.
UW has the largest UG program in the country. In the most recent national data, only 4 schools graduated over 100 majors - this year we will graduate 200. Ten years ago, we only graduated 57. This growth has been accompanied by a 10% decrease in the number of state-funded faculty, but we are continuing to provide an excellent education. You will need to make the effort, though, to be one of the students whose name we learn and who gets involved in our research. We provide 25-person breakout sessions at 100- and 300-level, and in all laboratories. We have a capstone requirement, and 80% meet that through research or participation in projects or engineering teams. SPS meets with colloquium speakers every week and has activities to provide community.
We recognize that you have varied opportunities at your HS. If you never took physics, and have only finished through algebra 2, you should sign up for the freshman interest group that combines precalculus and conceptual physics by inquiry. The regular sequence for scientists and engineers officially has the first quarter of calculus as a co-requisite. We only recommend this if you have already seen either physics or calculus in HS. Learning both at the same time can be challenging, and you will be better off taking Math 124 first, and then starting the physics series. Most students take PHYS 121 with MATH 125 (integral calculus). If you have taken both calculus and physics in high school, and are willing to put in the effort, we recommend the honors version (PHYS 141-12-3). AP at most gives credit for 121 (mechanics) and 122 (E&M). Unless you had a very strong program, we recommend taking Honors 141-2-3 to refresh this material.
Our degree is flexible, with four different degree tracks depending on your interest and goals. All majors complete a common core: introductory mechanics (energy and motion), electricity and magnetism, waves, optics, thermal and statistical physics, quantum mechanics. Also mathematical tools, electronics lab, advanced electricity and magnetism. Remainder depends on degree option. Choose your option by choosing the courses you wish to take, then figuring out which makes you add the fewest number of courses not on that list. The different degree requirements are listed on a slide near the end of this file.

https://phys.washington.edu/declaring-major
Physics is a great “liberal arts” major in STEM. It prepares you for a wide variety of careers and educational opportunities. It does require focus, resilience and hard work. Students who do not really want to be here, tend to struggle. They usually thrive once they find their place elsewhere in the university. We require students complete the introductory sequence and start the 200-level courses before being admitted to the major so they know what they are getting into and are assured of having the prerequisite knowledge in hand for success.
We were forced to become capacity-constrained to continue to provide an excellent and broad education under our current level of resources. Admissions cycle: open every Autumn and Spring. Apply during first three weeks of quarter while taking a 200-level or higher course. Winter is reserved for transfers and extended premajors only. Last quarter was our first cycle. We admitted 80% of applicants.
If there are holes in your skill or knowledge base, you can fix them with enough interest to seek out the resources that will help you fill those holes. If you have been admitted to UW, you are smart enough to be a physics major. Students who struggle in the major typically have had something external impact their studies – health issues, change in family circumstances, new interests developing outside of physics. Often, engagement in research makes the coursework “real” and improves students’ grades.
If you want information about national statistics on what physics majors do after graduation, and how to find a job, the national society of physics students is a great resource: spsnational.org. Their careers toolbox has a lot of useful information. Another good source is the American Institute of Physics, which has a great dataset on physics education and careers at aip.org/statistics. For graduate school information, go to gradschoolshopper.com. Our students get great jobs and are admitted to top graduate schools in physics, astronomy, data science, engineering.
Nationally, a little over half of physics graduates are working one year after their degree. Of those who go to grad school, 60% go in physics or astronomy, and the rest in engineering, CS, education, etc. Locally, a slightly higher fraction go directly to the work force or to engineering master’s programs, a consequence of our applied physics degree option.
In 2010, the Census bureau asked people what their bachelors degree is in, plus what their job category is. Physical scientists end up all over. Only about 20% end up in a “STEM” job. Note, however, that many of the others use their science background. For example, I count under “Education”; in the Arts, someone might be programing realistic CGI footage; Law could be patents. Note that engineering and CS are far more likely to stay in their field, but even then, only about half do.
With a little planning, physics majors can be competitive for most of the jobs that engineers apply to. Physics salaries one year out are good. UW Applied Physics students interested in these jobs should attend engineering job fairs and get involved in engineering teams such as robotics, human powered submarine, advanced rocket propulsion, etc.
These are mostly UW grads – ranging from those you expect, like Amazon, Google, Boeing to venture capital, public utilities, tech suppliers. Anything where you need to solve complex problems.
We look forward to your joining us!!

To talk with us or get your questions answered during the COVID-19 shut-down:
https://phys.washington.edu/advising-student-services-0  physadvs@uw.edu

SPS Annual Trip to LIGO

Intro Tutorial

UG Collaborate on Research

Advanced Lab
Details for the Interested Student

- Contact Information for Physics Student Services and Advising
- Major Requirements: Core + Degree Options
- Minor Requirements
- Major Application Procedure
- Satisfactory Progress Policy
- Selected Data from 2020 Pre-Graduation Survey
  - Career goals
  - Research participation
  - Factors that can delay graduation
  - Satisfaction with program
  - Preparation for program

Physics Student Services – PAT C139

- Director of Student Services
  - Catherine Provost (cuala@uw.edu)
  - All graduate issues
  - Grad school-related UG issues
- Staff Advisors
  - Margot Nims (sassy2@uw.edu) and Paula Newcomer (newcomer@uw.edu)
  - All undergraduate issues
- Introductory Sequence Program Coordinator
  - Susan Miller (susanh82@uw.edu)
  - 100-level course logistics
- Faculty Advisor
  - Prof. Marjorie Olmstead (ufaphys@uw.edu)
  - advice from a faculty member
  - waivers and substitutions
- Program Assistant
  - Amy Glenz (amyglenz@uw.edu)

To reach us during the COVID-19 shut-down: [https://phys.washington.edu/advising-student-services-0](https://phys.washington.edu/advising-student-services-0)
### Common Physics Core (55 cr) – taken by all majors

- 5-quarter overview of physics (21 cr)
  - Motion; Electricity & Magnetism; Oscillations & Waves; Thermal Physics; Quantum Physics
- Key tools for doing physics (8 cr)
  - Mathematical tools
  - Electronics lab
  - Overview of physics research
- Common sequence for applying those tools (8 cr)
  - Advanced Electricity and Magnetism
- At least 4 quarters of math (≥ 18 cr)
  - One year of Calculus
  - Selections from Linear Algebra, Differential Equations, Vector Calculus, Partial Diff. Eqn, Complex Analysis

See [https://phys.washington.edu/major-requirements](https://phys.washington.edu/major-requirements)

### Physics Degree Option Requirements

<table>
<thead>
<tr>
<th></th>
<th>Comprehensive (+38-41 cr)</th>
<th>Applied (+33-36 cr)</th>
<th>Teaching (+38-41 cr)</th>
<th>Biological (+51-55 cr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td>Math Phys II +</td>
<td>Matlab or Python +</td>
<td>Math Phys II +</td>
<td>Math Phys II</td>
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<td>Another adv. math</td>
<td>+2 adv. math</td>
<td>Another adv. math</td>
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<td>32x Relativity &amp; Particles,</td>
<td>One from “call me a</td>
<td>Relativity &amp; Particles,</td>
<td>Quantum Mechanics</td>
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<td>Quantum Mechanics; 3 of E&amp;M,</td>
<td>physicist” list</td>
<td>Quantum Mechanics;</td>
<td>Statistical Physics</td>
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<td>QM, Astro, Classical Mech,</td>
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<td>1 more “call me a</td>
<td>1 more “call me a</td>
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<td>Stat Mech</td>
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<td>physicist”</td>
<td>physicist”</td>
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<tr>
<td>Lab</td>
<td>Two advanced labs</td>
<td>Data Analysis lab</td>
<td>One advanced lab</td>
<td>(in bio/chem)</td>
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<tr>
<td></td>
<td></td>
<td>Two advanced labs</td>
<td></td>
<td></td>
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<tr>
<td>Capstone</td>
<td>Research or Seminar</td>
<td>Research, internship</td>
<td>Teaching practicum</td>
<td>bio-related research</td>
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<td></td>
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<td>or Seminar</td>
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<td>UD Elect</td>
<td>2 additional Phys/Cognate</td>
<td>3 additional Phys/</td>
<td>Sequence for future</td>
<td>Biophysics</td>
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<td>Class</td>
<td>Cognate (may</td>
<td>teachers</td>
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<td>include 1 lab; 1</td>
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<td>intro sci)</td>
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<td>1 year intro chemistry</td>
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<td>2 qtrs. Intro biology</td>
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<td></td>
<td>2 additional bio/chem</td>
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</tbody>
</table>
Physics Minor (30-36 cr, plus math*)

<table>
<thead>
<tr>
<th>Core (21 cr)</th>
<th><a href="https://phys.washington.edu/minor-physics">https://phys.washington.edu/minor-physics</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion, Electricity &amp; Magnetism, Oscillations &amp; Waves, Thermal Physics, Quantum Physics</td>
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</table>

<table>
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<tr>
<th>Specialization (Pick 1)</th>
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<tbody>
<tr>
<td>Physics Education (15 cr)</td>
<td>Physics by Inquiry Series</td>
</tr>
<tr>
<td>Experimental Physics (9 cr)</td>
<td>Intro Laboratory Analysis Electronics Lab Additional Advanced Lab</td>
</tr>
<tr>
<td>Mathematical Physics (12 cr)</td>
<td>Math Physics I and II: Phys 227, 228 Either Electricity &amp; Magnetism (321) or Quantum Mechanics (324)</td>
</tr>
</tbody>
</table>

*Note: Prerequisites for these classes includes 15 credits of calculus sequence, plus 6-7 credits of advanced math

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Declaring a Physics Major

1. Complete PHYS 123 and MATH 126.  
2. Take a physics course within the previous two quarters and be enrolled in a physics course with number > 220.  
3. Develop a graduation plan and enter into UW MyPlan.  
   - Apply online during first three weeks of Spring or Autumn quarter.*  
   - Meeting minimum requirements does not guarantee admission. Admission is capacity constrained, based on holistic review of a student’s record.  
   - New majors must agree to the department Code of Conduct and have their graduation plan approved by Physics Student Services.  
   - See department website for sample graduation plans

* Winter quarter for transfer students or extended premajors only
Criteria for Satisfactory Progress

• Students must take physics courses, courses from the menu of math classes, or electives in other departments that meet a requirement for the physics major. Exceptions (e.g. for double major, study abroad) should be pre-approved.
• Maintain a cumulative average GPA of at least 2.0 in all physics classes.
• Students must earn a numerical grade of at least a 2.0 in each course used to satisfy the requirements of the physics major.

See https://phys.washington.edu/uw-physics-major-continuation-policy

Some results from this year’s survey of graduating seniors (filed 2 to 10 months prior to graduation)

• Career Goals
• Participation in Research
• Causes for delays in their graduation
• How well their previous institution prepared them for the physics major
Career Goals

What type of job do you envision having in 10-15 years? (check all that apply)

- R&D in government lab
- R&D in industrial lab
- Prof. at research university
- Prof. at 4-yr college
- Prof. at 2-yr college
- K-12 Teacher
- Engineer
- Computer/IT/Data Science
- Tech-support
- Technology transfer
- Medicine / medical phys
- non-STEM job
- Military
- Lawyer
- Pilot/astronaut
- Other
- I haven’t thought that far ahead.

Participation in Research

- From 2019-20 Graduation Survey (filed 2 to 10 months before graduation)
  - Have completed research for credit: 59%
  - Plan to do so before graduation: 21%
  - No, I had difficulty finding project or fitting to my schedule: 16%
  - Not interested in pursuing research: 4%

- From Transcripts Aut 16 through Win 20
  - 302 distinct students received undergraduate credit for doing research with 43 distinct physics faculty, for a total of over 1200 credit hours
  - 80% of graduates received credit for doing research either in physics or elsewhere on campus
What factors impacted your ability to graduate in four years from starting college (at UW or elsewhere)?

- I have changed majors or chosen a major late.
- There are too few credits given per required core physics course.
- Health or other personal problems slowed my progress.
- I have been delayed by inability to enroll in physics classes that I...
- I am pursuing two or more majors/degrees.
- I have been unable to take full course loads due to financial needs.
- There were not enough physics classes offered at my previous...
- I took some time off for travel or other non-work opportunities.
- I have been delayed by inability to enroll in non-physics classes...
- I took fewer courses each quarter so that I could get better grades.
- Something else

Preparation for our program

How well did your educational experiences prior to UW prepare you for the skills and knowledge needed to succeed in your UW physics courses?

- scientific reasoning
- problem solving skills
- math knowledge
- organizational skills
- physics knowledge
- study skills
- time management skills

very underprepared
underprepared
adequate preparation
good preparation
more than I needed