UW Physics Undergraduate Program: Details for the Interested Student

• Contact Information for Physics Student Services and Advising
• Major Requirements: Core + Degree Options + Capstone and Honors
• Minor Requirements
• Major Application Procedure
• Satisfactory Progress Policy
• Selected Data from 2020-22 Pre-Graduation Survey
  • Career goals
  • Research participation
  • Factors that can delay graduation
  • Preparation for program
Physics Student Services – PAT C139 – physadvs@uw.edu

- **Director of Student Services**
  - Catherine Provost (cuala@uw.edu)
    - All graduate issues
    - Grad school-related UG issues

- **Staff Advisors**
  - Jeanny Mai (jeanny@uw.edu) and Paula Newcomer (newcomer@uw.edu)
    - All undergraduate issues

- **Introductory Sequence Program Coordinator**
  - Susan Miller (phys1xx@uw.edu)
    - 100-level course logistics

- **Faculty Advisor**
  - Prof. Marjorie Olmstead (ufaphys@uw.edu)
    - Advice from a faculty member
    - Waivers and substitutions

- **Program Assistant**
  - Lihong Zhang (starting April 18)
    - Scheduling and Information

Anything related to student services: physadvs@uw.edu

Links to Drop-In Zoom and Appointment Calendar:
https://phys.washington.edu/advising-student-services

Me !!!!
Common Physics Core (55-57 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 (18-20 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
## Physics Degree Option Requirements

<table>
<thead>
<tr>
<th></th>
<th>Comprehensive (+38-42 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><strong>Math</strong></td>
<td>Math Phys II + Another adv. math</td>
<td>Matlab or Python + +2 adv. math</td>
<td>Math Phys II + Another adv. math</td>
<td>Math Phys II</td>
</tr>
<tr>
<td><strong>32x</strong></td>
<td>Relativity &amp; Particles, Quantum Mechanics; 3 of E&amp;M, QM, Astro, Classical Mech, Stat Mech</td>
<td>One from “call me a physicist” list</td>
<td>Relativity &amp; Particles, Quantum Mechanics; 1 more “call me a physicist”</td>
<td>Quantum Mechanics Statistical Physics 1 more “call me a physicist”</td>
</tr>
<tr>
<td><strong>Lab</strong></td>
<td>Two advanced labs</td>
<td>Data Analysis lab Two advanced labs</td>
<td>One advanced lab</td>
<td>(in bio/chem)</td>
</tr>
<tr>
<td><strong>Capstone</strong></td>
<td>Research, Teaching practicum, Internship or Seminar</td>
<td>Research, Teaching practicum, Internship or Seminar</td>
<td>Teaching practicum</td>
<td>bio-related research</td>
</tr>
<tr>
<td><strong>UD Elect</strong></td>
<td>2 additional Phys/Cognate Class</td>
<td>3 additional Phys/Cognate (may include 1 lab; 1 intro sci)</td>
<td>Sequence for future teachers</td>
<td>Biophysics</td>
</tr>
<tr>
<td><strong>Other Sci</strong></td>
<td></td>
<td></td>
<td></td>
<td>1 year intro chemistry 2 qtrs. Intro biology 2 additional bio/chem</td>
</tr>
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</table>
Physics Capstone

• Spirit of the Requirement:
  Use critical thinking to independently apply skills and knowledge acquired in the physics curriculum to an activity outside the classroom

• Ways to meet the requirement:
  • Research for credit in physics or astronomy
  • Honors thesis (**NEW**) 
  • Pedagogy course icw learning assistant in introductory classes
  • Directed reading in physics course
  • Senior seminar courses
  • Research outside the department†
  • Internship or other activity outside the department†

† requires a paper and credits to assign (either extra elective or research credits outside dept)
Physics Departmental Honors

• Celebrate our top students
• Encourage students to get the experience needed for graduate school
• Requirements:
  • Physics GPA ≥ 3.6 in all courses ≥ 200 level
  • Honors thesis (PHYS 488) based on physics-related research (PHYS 499)†
  • Oral and Poster presentation of thesis project (PHYS 488)
  • Participation in Honors Seminar (PHYS 484-5-6)
    and/or Directed Reading in Physics (PHYS 498)

†out of department or off-site OK with prior permission
## 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>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialization (Pick 1)</th>
<th></th>
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<tbody>
<tr>
<td>Physics Education (15 cr)</td>
<td>Physics by Inquiry Series (407-408-409)</td>
</tr>
<tr>
<td>Experimental Physics (9 cr)</td>
<td>Intro Laboratory Analysis (231)</td>
</tr>
<tr>
<td></td>
<td>Electronics Lab (334)</td>
</tr>
<tr>
<td></td>
<td>Additional Advanced Lab (6 choices)</td>
</tr>
<tr>
<td>Mathematical Physics (12 cr)</td>
<td>Math Physics I: Phys 227 + 2 of Math Physics II (228), Electricity &amp; Magnetism (321, 322) and/or Quantum Mechanics (324)</td>
</tr>
</tbody>
</table>

*Note: Prerequisites for these classes include 15 credits of calculus sequence, plus 6-7 credits of advanced math
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 by Oct 5 (for winter admission) or April 5 (for summer/autumn admission).*
   - 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

† Will likely have an “Early” admission option during PHYS 123/MATH 126 soon
* Winter quarter for transfer students or extended premajors only

See https://phys.washington.edu/declaring-major
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
Senior Exit Survey Results
(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
What type of job do you envision having in 10-15 years? (check all that apply)

Fraction of Students (classes of 2021 and 2022)

- Engineer
- Industry R&D
- Gov't R&D
- Comp / IT
- Univ Prof
- non-STEM job
- Tech support
- College Prof
- Medicine
- CC Prof
- K-12 Teach
- Tech Transfer
- Law
- Other:
- No Idea

Career Goals

- Engin/Appl Phys
- Computing/IT
- Education
- Med/Law
- Something else
- Haven’t thought about it
Participation in Research

- From 2019-20 Graduation Survey (filed 2 to 10 months before graduation)
  - 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

| Have completed research for credit | 58% |
| Plan to do so before graduation   | 22% |
| No, I had difficulty finding project or fitting to my schedule | 17% |
| Not interested in pursuing research | 6% |

- From Transcripts Aut 16 through Spr 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.
Health or other personal problems slowed my progress.
There are too few credits given per required core physics course.
I have been delayed by inability to enroll in physics classes.
I am pursuing two or more majors/degrees
I took fewer courses each quarter so that I could get better grades.
I have been delayed by inability to enroll in non-physics classes.
I have been unable to take full course loads due to financial needs.
Not enough physics classes offered at my previous institution.
I took some time off for travel or other non-work opportunities.
Something else (please describe below)

Very Important
Reasonably Important
Somewhat Important
Of Minor Importance

UW Physics Exit Surveys: Classes of 2020, 2021 and most of 2022
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:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Math Knowledge:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Problem Solving Skills:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Physics Knowledge:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Organizational Skills:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Time Management Skills:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%

- Study Skills:
  - More than I needed: ~60%
  - Good preparation: ~30%
  - Adequate preparation: ~6%
  - Underprepared: ~3%
  - Very underprepared: ~1%
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