PHYSICS, CERTIFICATE

The department offers an undergraduate certificate in physics. An understanding of the physical universe informs many disciplines. The study of physics is essential to understanding nature and to advancing technology in the coming century. A certificate in physics increases the opportunities for students to become better informed on technological issues at the local, state, national, and international levels.

The certificate is designed to serve undergraduates majoring in biology, chemistry, mathematics, engineering, education and other fields who wish to extend their study of physics beyond what may be required or recommended for their major without completing the full L&S physics major requirements.

HOW TO GET IN

To declare a certificate in physics, students must fill out a major/certificate declaration form. An undergraduate physics advisor must sign the form. The form to declare the certificate can be obtained at the Physics departmental office. All undergraduate students are eligible to declare the certificate, except those declared in the following majors: Physics, Astronomy-Physics, and Applied Mathematics, Engineering, and Physics (AMEP).

REQUIREMENTS

CERTIFICATE REQUIREMENTS

The physics certificate requires 18 credits of Intermediate or Advanced level undergraduate PHYSICS courses, with the following restrictions:

- At least 9 of the credits must be in residence.
- At most one course from each of the three semesters of an introductory sequence can be counted.
- At most 3 credits of directed study can be counted.
- Only graded courses may be used toward the certificate.
- A minimum grade point average of 2.000 is required in all certificate courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYSICS 247</td>
<td>A Modern Introduction to Physics (recommended)</td>
<td>5</td>
</tr>
<tr>
<td>PHYSICS 207</td>
<td>General Physics</td>
<td></td>
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<tr>
<td>PHYSICS 201</td>
<td>General Physics</td>
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<tr>
<td>E M A 201 &amp; E M A 202</td>
<td>Statics and Dynamics ¹</td>
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<tr>
<td>E M A 201 &amp; M E 240</td>
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<tr>
<td>PHYSICS 248</td>
<td>A Modern Introduction to Physics (recommended) ²</td>
<td>5</td>
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<tr>
<td>PHYSICS 208</td>
<td>General Physics</td>
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<tr>
<td>PHYSICS 202</td>
<td>General Physics</td>
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</tbody>
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Directed Study (optional, maximum 3 credits) 0-3

- PHYSICS 299 | Directed Study
- PHYSICS 499 | Directed Study
- PHYSICS 681 | Senior Honors Thesis
- PHYSICS 682 | Senior Honors Thesis
- PHYSICS 691 | Senior Thesis
- PHYSICS 692 | Senior Thesis

Additional Intermediate and Advanced PHYSICS courses 1-5

- PHYSICS/ MED PHYS 265 | Introduction to Medical Physics
- PHYSICS 301 | Physics Today
- PHYSICS 307 | Intermediate Laboratory-Mechanics and Modern Physics
- PHYSICS 311 | Mechanics
- PHYSICS 321 | Electric Circuits and Electronics
- PHYSICS 322 | Electromagnetic Fields
- PHYSICS 323 | Electromagnetic Fields
- PHYSICS 325 | Optics
- PHYSICS 371 | Acoustics for Musicians
- PHYSICS 407 | Advanced Laboratory
- PHYSICS 415 | Thermal Physics
- PHYSICS 448 | Atomic and Quantum Physics
- PHYSICS 449 | Atomic and Quantum Physics
- PHYSICS/ ENVIR ST 472 | Scientific Background to Global Environmental Problems
- PHYSICS/B M E/H ONCOL/MED PHYS 501 | Radiation Physics and Dosimetry
- PHYSICS/E C E/N E 525 | Introduction to Plasmas
- PHYSICS/E C E/N E 527 | Plasma Confinement and Heating
- PHYSICS 531 | Introduction to Quantum Mechanics
- PHYSICS 535 | Introduction to Particle Physics
- PHYSICS 545 | Introduction to Atomic Structure
- PHYSICS/E C E/E E C E 546 | Lasers
- PHYSICS 551 | Solid State Physics
- PHYSICS 563 | Microscopy of Life
- PHYSICS/B M E/MED PHYS/PHMCOL-M/RADIOL 619 | Radiation Physics and Dosimetry
- PHYSICS 623 | Electronic Aids to Measurement
- PHYSICS 625 | Applied Optics

Total Credits 18
A maximum of 5 credits from E M A 201, E M A 202 and M E 240 count toward the 18 credits required for the certificate.

Students may not transfer into the PHYSICS 247 - PHYSICS 248 - PHYSICS 249 sequence from another introductory sequence.

CERTIFICATE COMPLETION REQUIREMENT

This undergraduate certificate must be completed concurrently with the student’s undergraduate degree. Students cannot delay degree completion to complete the certificate.

LEARNING OUTCOMES

1. Understand basic physical principles.
2. Solve problems proficiently using both quantitative and qualitative applications of these physical principles.
3. Know how to perform quantitative measurements of physical phenomena and understand the statistical significance of observations made in the presence of statistical and systematic uncertainties.
4. Be prepared for graduate study and/or careers in STEM fields.
5. Communicate effectively with scientific peers and the public, both orally and in writing.

ADVISORS

Professor Tulika Bose
Professor Jan Egedal
Professor Deniz Yavuz

SCHEDULING AN ADVISING APPOINTMENT WITH A PHYSICS MAJOR ADVISOR:

To meet with a Physics major advisor, you may either email physics-advisors@wisc.edu or contact them directly.

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/)
• 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/)

PEOPLE

FACULTY

Yang Bai (https://www.physics.wisc.edu/people/yangbai/), Professor
Baha Balantekin (https://www.physics.wisc.edu/people/bahabalantekin/), Eugene P. Wigner Professor
Vernon Barger (https://www.physics.wisc.edu/people/vernon-dbarger/), Vilas Professor and Van Vleck Professor
Keith Bechtol (https://www.physics.wisc.edu/people/keithbechtol/), Assistant Professor
Uwe Bergmann (http://www.physics.wisc.edu/people/uwebergmann/), Martin L. Perl Endowed Professor in Ultrafast X-Ray Science
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Sau Lan Wu (https://www.physics.wisc.edu/people/sau-lanwu/), Enrico Fermi Professor and Vilas Professor
Deniz Yavuz (https://www.physics.wisc.edu/people/denizyavuz/), Professor
Ellen Zweibel (https://www.physics.wisc.edu/people/ellen-gzweibel/), William L Kraushaar Professor of Astronomy & Physics