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).

**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 249</td>
<td>A Modern Introduction to Physics (recommended)²</td>
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<tr>
<td>PHYSICS 205</td>
<td>Modern Physics for Engineers</td>
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<tr>
<td>PHYSICS/ E C E 235</td>
<td>Introduction to Solid State Electronics</td>
<td></td>
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<tr>
<td>PHYSICS 241</td>
<td>Introduction to Modern Physics</td>
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**Directed Study (optional, maximum 3 credits)**

- 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**

- 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 546 Lasers
- PHYSICS 551 Solid State Physics
- PHYSICS/ MED PHYS 563 Radionuclides in Medicine and Biology
- PHYSICS/B M E/ MED PHYS/ PHMCOL-M/ RADIOL 619 Microscopy of Life
- PHYSICS 623 Electronic Aids to Measurement
- PHYSICS 625 Applied Optics

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<tr>
<td>PHYSICS 202</td>
<td>General Physics</td>
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</tbody>
</table>

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.

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