

# PHYSICS AND EDUCATIONAL STUDIES: *DEPARTMENT-SPECIFIC REQUIREMENTS CHART*

	<b>Educational Studies Major, Secondary Teacher Certification in Physics</b>	<b>Physics and Educational Studies Course Special Major</b>
Physics Requirements (PHYS)	<p><b>Total: 8 credits</b></p> <ul style="list-style-type: none"> <li>— PHYS 005: The World of Particles and Waves</li> <li>— PHYS 006: Foundations of Contemporary Physics</li> <li>— PHYS 007: Introductory Mechanics</li> <li>— PHYS 008: Electricity, Magnetism, and Waves <i>(May be substituted with PHYS 003 or 004 with permission)</i></li> <li>— PHYS 107: Quantum Mechanics</li> <li>— PHYS 063: Procedures in Experimental Physics (0.5 cr)</li> <li>— PHYS 064: Introduction to Scientific Computation (0.5 cr) <i>(May substitute another course giving facility with computation)</i></li> </ul> <p>Choice of 2 of the following:</p> <ul style="list-style-type: none"> <li>— PHYS 111: Analytical Dynamics</li> <li>— PHYS 112: Electrodynamics</li> <li>— PHYS 114: Statistical Physics</li> </ul>	<p><b>Total: 8 credits</b></p> <ul style="list-style-type: none"> <li>— PHYS 005: The World of Particles and Waves</li> <li>— PHYS 006: Foundations of Contemporary Physics</li> <li>— PHYS 007: Introductory Mechanics</li> <li>— PHYS 008: Electricity, Magnetism, and Waves <i>(May be substituted with PHYS 003 or 004 with permission)</i></li> <li>— PHYS 107: Quantum Mechanics</li> <li>— PHYS 063: Procedures in Experimental Physics (0.5 cr)</li> <li>— PHYS 064: Introduction to Scientific Computation (0.5 cr) <i>(May substitute another course giving facility with computation)</i></li> </ul> <p>Choice of 2 of the following:</p> <ul style="list-style-type: none"> <li>— PHYS 111: Analytical Dynamics</li> <li>— PHYS 112: Electrodynamics</li> <li>— PHYS 114: Statistical Physics</li> </ul>
Thesis (EDUC/PHYS)	<p><b>Total: 1 credit</b></p> <p>Topic: Physics pedagogy</p>	<p><b>Total: 1 credit</b></p> <p>Topic: Physics pedagogy</p>
Educational Studies Requirements	<ul style="list-style-type: none"> <li>— Serve as peer assistant in PHYS 003, 004, 003L, or 004L for at least one semester.</li> <li>— EDUC 075 Introduction to Science Pedagogy</li> </ul> <p><b>Total: 9.5 credits in Educational Studies</b></p> <p>Refer to description of general Educational Studies Secondary Certification Requirements.</p>	<p><b>Total: 5 credits in Educational Studies</b></p>
Strongly Recommended	<ul style="list-style-type: none"> <li>— CHEM 010: General Chemistry</li> <li>— BIOL 001: Cellular and Molecular Biology <i>or</i> BIOL 002: Organismal and Population Biology</li> <li>— Complete research with a faculty member</li> </ul>	

For more information,  
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# PHYSICS AND EDUCATIONAL STUDIES: *DEPARTMENT-SPECIFIC REQUIREMENTS CHART*

	<b>Special Major Physics and Educational Studies, Secondary Teacher Certification in Physics</b>	<b>Physics Major and Educational Studies Minor, Secondary Teacher Certification in Physics</b>	<b>Astrophysics Special Major and Educational Studies Minor, Secondary Certification Physics</b>
Physics Requirements (PHYS)	<p><b>Total: 8 credits</b></p> <ul style="list-style-type: none"> <li>— PHYS 005: The World of Particles and Waves</li> <li>— PHYS 006: Foundations of Contemporary Physics</li> <li>— PHYS 007: Introductory Mechanics</li> <li>— PHYS 008: Electricity, Magnetism, and Waves <i>(May be substituted with PHYS 003 or 004 with permission)</i></li> <li>— PHYS 107: Quantum Mechanics</li> <li>— PHYS 063: Procedures in Experimental Physics (0.5 cr)</li> <li>— PHYS 064: Introduction to Scientific Computation (0.5 cr) <i>(May substitute another course giving facility with computation)</i></li> </ul> <p>Choice of 2 of the following:</p> <ul style="list-style-type: none"> <li>— PHYS 111: Analytical Dynamics</li> <li>— PHYS 112: Electrodynamics</li> <li>— PHYS 114: Statistical Physics</li> </ul>	<p><b>Total: 10 credits</b></p> <ul style="list-style-type: none"> <li>— PHYS 005: The World of Particles and Waves</li> <li>— PHYS 006: Foundations of Contemporary Physics</li> <li>— PHYS 007: Introductory Mechanics</li> <li>— PHYS 008: Electricity, Magnetism, and Waves <i>(May be substituted with PHYS 003 or 004 with permission)</i></li> <li>— PHYS 107: Quantum Mechanics</li> <li>— PHYS 063: Procedures in Experimental Physics (0.5 cr)</li> <li>— PHYS 064: Introduction to Scientific Computation (0.5 cr) <i>(May substitute another course giving facility with computation)</i></li> <li>— PHYS 081 and 082: Advanced Lab I and II (0.5 credit each)</li> </ul> <p>Choice of 2 of the following:</p> <ul style="list-style-type: none"> <li>— PHYS 111: Analytical Dynamics</li> <li>— PHYS 112: Electrodynamics</li> <li>— PHYS 114: Statistical Physics</li> </ul> <p>One additional 100-level from Physics or Astronomy</p>	<p><b>Total: 11 credits</b></p> <ul style="list-style-type: none"> <li>— PHYS 005: The World of Particles and Waves</li> <li>— PHYS 006: Foundations of Contemporary Physics</li> <li>— PHYS 007: Introductory Mechanics</li> <li>— PHYS 008: Electricity, Magnetism, and Waves <i>(May be substituted with PHYS 003 or 004 with permission)</i></li> <li>— ASTR 016: Modern Astrophysics</li> <li>— PHYS 107: Quantum Mechanics</li> <li>— PHYS 063: Procedures in Experimental Physics (0.5 cr)</li> <li>— PHYS 064: Introduction to Scientific Computation (0.5 cr) <i>(May substitute another course giving facility with computation)</i></li> </ul> <p>Choice of 2 of the following:</p> <ul style="list-style-type: none"> <li>— PHYS 111: Analytical Dynamics</li> <li>— PHYS 112: Electrodynamics</li> <li>— PHYS 114: Statistical Physics</li> </ul> <p>Two additional 100-level Astronomy offerings</p>
Thesis (EDUC/PHYS)	<p><b>Total: 1 credit</b></p> <p>Topic: Physics pedagogy</p>	Thesis/examination details provided by Major Department	Thesis/examination details provided by Major Department
Additional Departmental Requirements	<ul style="list-style-type: none"> <li>— Serve as a lab assistant or science associate in PHYS 003, and 004 or 004L for at least one semester.</li> <li>— EDUC 075 Introduction to Science Pedagogy</li> </ul>	<p><b>Total: 5 credits</b></p> <ul style="list-style-type: none"> <li>— MATH 015: Elementary Single-Variable Calculus</li> <li>— MATH 025: Further Topics in Single-Variable Calculus</li> <li>— MATH 027: Linear Algebra</li> <li>— MATH 033: Basic Several Variable Calculus</li> <li>— Serve as a lab assistant or science associate in PHYS 003, and 004 or 004L for at least one semester.</li> <li>— EDUC 075 Introduction to Science Pedagogy</li> </ul>	<p><b>Total: 5 credits</b></p> <ul style="list-style-type: none"> <li>— MATH 015: Elementary Single-Variable Calculus</li> <li>— MATH 025: Further Topics in Single-Variable Calculus</li> <li>— MATH 027: Linear Algebra</li> <li>— MATH 033: Basic Several Variable Calculus</li> <li>— Serve as a lab assistant or science associate in PHYS 003, and 004 or 004L for at least one semester.</li> <li>— EDUC 075 Introduction to Science Pedagogy</li> </ul>
Strongly Recommended	<ul style="list-style-type: none"> <li>— CHEM 010: General Chemistry</li> <li>— BIOL 001: Cellular and Molecular Biology <u>or</u> BIOL 002: Organismal and Population Biology</li> <li>— Complete research with a faculty member</li> </ul>	<ul style="list-style-type: none"> <li>— CHEM 010: General Chemistry</li> <li>— BIOL 001: Cellular and Molecular Biology <u>or</u> BIOL 002: Organismal and Population Biology</li> <li>— Complete research with a faculty member</li> </ul>	<ul style="list-style-type: none"> <li>— CHEM 010: General Chemistry</li> <li>— BIOL 001: Cellular and Molecular Biology <u>or</u> BIOL 002: Organismal and Population Biology</li> <li>— Complete research with a faculty member</li> </ul>
Educational Studies Requirements	<p><b>Total: 9.5 credits in Educational Studies</b></p> <p>Refer to description of general Educational Studies Secondary Certification Requirements.</p>	<p><b>Total: 9.5 credits in Educational Studies</b></p> <p>Refer to description of general Educational Studies Secondary Certification Requirements.</p>	<p><b>Total: 9.5 credits in Educational Studies</b></p> <p>Refer to description of general Educational Studies Secondary Certification Requirements.</p>

**Additional Notes:**

1. This chart lists only the Physics Department's requirements for special majors and/or secondary certification. The required Educational Studies courses are described elsewhere.
2. Occasionally departments have special offerings that may fulfill the required content. Please meet with your advisor or department chair to discuss such opportunities.
3. The Department of Educational Studies works closely with each individual student to determine a semester-by-semester plan.
4. Please see the Chair of the Department of Educational Studies to design a plan that includes Honors.

**Mission Statement for Secondary Physics Certification Program**

The Secondary Physics certification program engages students in the investigation of educational theory, policy, research, and practice. Candidates for certification develop their pedagogical content knowledge in physics as well as their general knowledge of the subject. The program encourages undergraduates to think critically and creatively about the processes of teaching and adolescent learning and about the place of education in society. The program is committed to preparing students to employ evidence-based practice. Instructional practice, including the use of technology and assessments, are designed to enable preservice teachers to meet the needs of all students, including those with learning differences, and with consideration for racial, ethnic, linguistic and/or social economic diversity.