

<b>PhD in Physics or Astronomy</b>				
(1) <b>Where are the learning outcomes for this level/program published? (please specify) Include URLs where appropriate.</b>	(2) <b>Other than GPA, what data/evidence is used to determine that graduates have achieved the stated outcomes for the degree? (e.g., capstone course, portfolio review, licensure examination)</b>	(3) <b>Who interprets the evidence? What is the process? (e.g. annually by the curriculum committee)</b>	(4) <b>What changes have been made as a result of using the data/evidence?</b>	(5) <b>Date of most recent program review (for general education and each degree program)</b>
<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Create new knowledge in the discipline of physics or astronomy</li> <li>• Communicate effectively orally and in writing</li> <li>• Solve physics or astronomy problems using logical, mathematical and computational skills</li> <li>• Demonstrate an understanding of the key concepts in the core areas of physics or astronomy</li> <li>• Demonstrate competency teaching physics or astronomy topics and problem solving in a classroom setting</li> </ul>	<p>Oral communication is assessed in the dissertation defense.</p> <p>All other competencies are assessed in the completed dissertation</p>	<p>The thesis is read by a committee of three or four faculty, one of which must be outside the Physics and Astronomy department. Upon completion of the dissertation, the committee meets and makes a recommendation to the department chair. Once a year, department faculty discuss achievement of the stated learning outcomes across all doctoral recipients.</p>	<p>Recent changes have largely been a response to concerns about equity in students' opportunity to demonstrate achievement of outcomes. Since a time-limited qualifying exam does not reflect real-world circumstances, students demonstrate readiness for candidacy based on high grades in certain courses or, if the high grade threshold is not met, a take-home written assessment and an oral component.</p>	<p>Fall 2018</p>