PHYSICS - PH.D.

College of Arts and Sciences
Department of Physics
103 Smith Hall
Kent Campus
330-672-2246
physics-web@kent.edu
www.kent.edu/physics

Description
The Ph.D. degree in Physics provides training of professionals to conduct independently conceived programs of research or teaching in universities or research laboratories. Original research is required in fundamental or applied areas of physics, and the Ph.D. dissertation must be orally defended. Two years of graduate coursework, plus four years of research are typical.

FULLY OFFERED AT:
• Kent Campus

Admission Requirements
• Official transcript(s)
• Minimum 3.0 GPA
• Goal statement
• Three letters of recommendation
• Résumé or vita
• GRE (general) scores

English Language Proficiency Requirements for International Students: All international students must provide proof of English language proficiency (unless they meet specific exceptions) by earning a minimum 550 TOEFL score (79 on the Internet-based version), minimum 77 MELAB score, minimum 6.5 IELTS score or minimum 58 PTE Academic score. For more information on international admission, visit the Office of Global Education’s admission website. Effective spring 2018.

For more information about graduate admissions, please visit the Graduate Studies website.

1 Submission of physics subject GRE score is highly recommended to ensure an application for the Ph.D. degree is competitive.

Program Learning Outcomes
Graduates of these programs will be able to:
1. Demonstrate cognitive skills important to a physicist, including the following:
   a. Think critically and analytically
   b. Define and solve problems in physics
   c. Perform research in contemporary areas of physics research at the highest level and with a great deal of independence
2. Demonstrate a core knowledge and understanding of the foundations of physics.
3. Communicate and teach results of their work to peers, to various target groups within the physics community and to people outside the discipline.

Program Requirements
Major Requirements
[AS-PHD-PHY]

Major Requirements 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 75204</td>
<td>CLASSICAL ELECTRODYNAMICS II</td>
<td>3</td>
</tr>
<tr>
<td>PHY 75301</td>
<td>STATISTICAL MECHANICS I</td>
<td>4</td>
</tr>
<tr>
<td>PHY 76162</td>
<td>QUANTUM MECHANICS II</td>
<td>3</td>
</tr>
<tr>
<td>PHY 76163</td>
<td>QUANTUM MECHANICS III</td>
<td>3</td>
</tr>
<tr>
<td>PHY 76201</td>
<td>PARTICLE PHYSICS</td>
<td>3</td>
</tr>
<tr>
<td>PHY 76303</td>
<td>APPLICATIONS OF QUANTUM CHROMODYNAMICS</td>
<td>3</td>
</tr>
<tr>
<td>or PHY 76403</td>
<td>ADVANCED CONDENSED MATTER PHYSICS</td>
<td></td>
</tr>
<tr>
<td>or PHY 78401</td>
<td>LIQUID CRYSTAL PHYSICS</td>
<td></td>
</tr>
<tr>
<td>PHY 76401</td>
<td>SOLID STATE PHYSICS I</td>
<td>3</td>
</tr>
<tr>
<td>PHY 80199</td>
<td>DISSERTATION I</td>
<td>30</td>
</tr>
<tr>
<td>Additional Program Requirements 3</td>
<td>8-38</td>
<td></td>
</tr>
</tbody>
</table>

Minimum Total Credit Hours for Post-Baccalaureate Students 90
Minimum Total Credit Hours for Post-Master’s Students 60

1 Students may petition to substitute a specific course if a minimum B grade was earned for a course at another school that is judged to be equivalent.
2 Upon admission to candidacy, each student must register for PHY 80199 for a total of 30 credit hours. Thereafter, students should register for PHY 80299 continuously each term until all degree requirements have been met. The dissertation must present and interpret original research. Topics available for dissertation research are primarily in the areas of condensed matter physics, material science, biophysics, theoretical astrophysics and high-energy nuclear physics. Students present at least one seminar based on their dissertation research during their graduate career.
3 Additional Program Requirements are selected in consultation with the student’s faculty advisor and approved by the department.

Graduation Requirements
A total of 90 hours of credit beyond the baccalaureate degree, or 60 hours of credit beyond the master’s degree, is required. Students are required to complete 22 credit hours of core graduate physics and 8-38 credit hours of additional program requirements selected in consultation with the student’s faculty advisor and approved by the department. A minimum of 30 credit hours of dissertation is required. Students may petition to substitute a specific course if a grade of B (3.000) or higher was obtained for a course at another school that is judged to be equivalent. The required physics courses will prepare the student for the candidacy examination. Students present at least one seminar based on their dissertation research during their graduate career.