Physics

Discipline Coordinators
Paul Rulis, (816) 235-5945, rulisp@umkc.edu
Mark Brodwin, (816) 235-2508, brodwinm@umkc.edu

Physics faculty who are members of the doctoral faculty.

Physics is a discipline in the Interdisciplinary Ph.D. (http://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-program) Program administered by the School of Graduate Studies.

Note: The discipline-specific requirements listed here are in addition to the requirements listed in Interdisciplinary Ph.D. Application Procedure and Minimum Criteria for Admission and Minimum Interdisciplinary Ph.D. Academic Regulations and Degree Requirements.

Discipline-Specific Admission Requirements
For admission to the program, an applicant must meet both the Interdisciplinary Ph.D. and specific physics admission requirements. The doctoral studies committee of the Department of Physics will review applications and make admission recommendations to the Interdisciplinary Ph.D. Executive Committee. The basic criterion for admission is the likelihood that an applicant will be successful in the Interdisciplinary Ph.D. program, particularly in the research component of the program. All applicants must satisfy the doctoral studies committee that they meet this criterion through such evidence as transcripts, letters of recommendation, statements of purpose, GRE scores (general and subject), performance on the department written examination, etc. Furthermore, a member of the doctoral faculty must be willing to accept the applicant as a research student. International students are required to have a TOEFL score of at least 550 (213 CBT) for admission and 575 (230 CBT) to be eligible for a teaching assistantship.

Qualifying Requirements for Full Admission
In addition to the above requirements, applicants must meet the following minimum requirements for the appropriate category listed below to be considered for full admission with physics as a discipline. The doctoral studies committee may recommend provisional admission for those applicants who fail to meet these requirements.

Applicants for admission to the Interdisciplinary Ph.D. program electing physics as their primary discipline must have a bachelor’s or master’s degree in physics or the equivalent. Those applicants holding only a bachelor’s degree will be expected to provide exceptionally strong evidence of their academic ability and research capability in physics.

Applicants for admission to the Interdisciplinary Ph.D. program electing physics as their co-discipline must hold at least a bachelor’s degree in a compatible field. These applicants must have successfully completed coursework in physics beyond a first (general or engineering physics) introductory course and must have mathematical background sufficient for advanced coursework in physics.

Suggested Compatible Co-disciplines
Computer science, mathematics, chemistry, geosciences, electrical and computer engineering, telecommunication and computer networking, curriculum and instruction, and engineering

Core Program Requirements
The credit hour requirement for Ph.D. students with physics as a discipline will depend on the student’s entering status and individual program.

Physics as a Primary Discipline

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS 5500 &amp; PHYSICS 5501</td>
<td>Methods Of Mathematical Physics I and Methods Of Mathematical Physics II</td>
<td>6</td>
</tr>
<tr>
<td>PHYSICS 5510</td>
<td>Theoretical Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 5520 &amp; PHYSICS 5521</td>
<td>Electromagnetic Theory And Applications I and Electromagnetic Theory And Applications II</td>
<td>6</td>
</tr>
<tr>
<td>PHYSICS 5530 &amp; PHYSICS 5531</td>
<td>Quantum Mechanics I and Quantum Mechanics II</td>
<td>6</td>
</tr>
<tr>
<td>PHYSICS 5540</td>
<td>Statistical Physics I</td>
<td>3</td>
</tr>
</tbody>
</table>

Students with physics as their primary discipline must either complete these courses at UMKC or must have already completed equivalent coursework at approved institutions at the time of their admission to the Interdisciplinary Ph.D. program at UMKC.
Physics as a Co-discipline

Students are required to complete a minimum of three courses (9 credit hours) at the 300-level or above, from classes offered by the Department of Physics. At least three of these credit hours must be at the '5500+ level'. Labs, special topics and research courses do not satisfy any of the above requirements. Students who receive a grade of B- or less in two or more courses used to satisfy these requirements will be disqualified from using Physics as their co-discipline.

Other Discipline-Specific Special Requirements

Retention in Program

Ph.D. students with physics as their primary discipline must maintain a 3.25 grade-point average. Students with physics as a co-discipline must maintain a 3.0 GPA in physics courses. A student's failure to maintain the minimum GPA will result in a probationary status for the following semester. A failure to remove the GPA deficiency during the probationary semester will then result in the student's dismissal from the Interdisciplinary Ph.D. program.

Appeals

Exceptions to any of the discipline-specific regulations must be approved by the student's supervisory committee and by the physics doctoral studies committee. In the event of disputes or special requests concerning a student's Ph.D. program, written appeals and/or documentation must first be submitted to the student's supervisory committee. If a resolution of the problem cannot be affected at that level, the written appeals process must then progress through the following levels: (1) Doctoral studies committee of the Physics Department; (2) Interdisciplinary Ph.D. Executive Committee; (3) Dean of the School of Graduate Studies.

Interdisciplinary Ph.D. Examination Guidelines

Physics as Primary Unit

Departmental Written Examination (a.k.a. M.S. Comprehensive Exam, Ph.D. Qualifying Exam)

During January of each year, the Department of Physics and Astronomy will administer a written, M.S. Comprehensive/Ph.D. Qualifying examination of all M.S.-level physics students and Interdisciplinary Ph.D. students with physics as their primary discipline. The two-part examination will be given during two sessions (morning and afternoon) of four hours each on the first Saturday after the start of the Spring Semester. Each part of the examination will contain approximately eight questions at varying levels of difficulty (introductory to advanced undergraduate). The following subject areas will be addressed in the given order by the two examination sessions:

2. Quantum Mechanics and Thermodynamics.

Students may pass the written examination at the following ascending levels of achievement:

1. "M.S. Comprehensive" - necessary for the M.S. degree.
2. “Ph.D. Qualifying” - necessary for invitation to take the comprehensive examination in fulfillment of the Interdisciplinary Ph.D. program requirements.

Students need only pass the written examination once at any given achievement level. But, all graduate students must attempt the exam every year until they pass it at the appropriate level, unless they are granted an exception via a petition to the physics and astronomy faculty.

A maximum of two attempts at each level (M.S. Comprehensive, Ph.D. Qualifying) will be permitted, and any student who does not attempt the examination when required to do so will be deemed to have failed the examination on that attempt, unless they have been given prior permission to delay taking the exam. Students who are required to take this examination are encouraged to consult with the Department of Physics and Astronomy Graduate Advisor (http://cas.umkc.edu/physics/department/contacts.shtml) for detailed information concerning procedures and regulations for the examination.

Ph.D. Comprehensive Exam

Ph.D. seeking students who have passed the Departmental Written Exam at the Ph.D. qualifying level must pass a Ph.D. Comprehensive Exam to advance to Ph.D. Candidacy. The Ph.D. Comprehensive Exam consists of a proposal of the Ph.D. research topic written in the format of a National Science Foundation proposal narrative with an oral presentation to the student's five-person Ph.D. committee. This exam should be completed within 12 months of completing the coursework and qualifying exam degree requirements. The exact timing and topic of this written and oral comprehensive exam will be determined by the student and their supervisory committee.

Defense of Ph.D. Dissertation

The dissertation defense administered by the student's supervisory committee can be taken only after the student has passed their Ph.D. comprehensive exam. The defense may be oral, written, or both and it may include the student's thesis or dissertation proposal and associated background material.

Physics as an Interdisciplinary Ph.D. Co-discipline

There are no formal qualifying or comprehensive examination requirements for students whose co-discipline department is Physics & Astronomy.