

DOCTOR OF PHILOSOPHY IN NATURAL SCIENCES: PHYSICS

Student Learning Outcomes

Students graduating from this program will:

As part of the Natural Sciences Ph.D. program, students in a primary discipline of Physics must meet the minimum Ph.D. program requirements. These can be found within the main program page (<https://catalog.umkc.edu/colleges-schools/graduate-studies/phd-programs/>) and subsequent requirement pages.

Physics

Please see the School of Graduate Studies web page (<https://sgs.umkc.edu/academics/nat-sci-coordinators.html>) for the contact information for the discipline Coordinator. To view all doctoral and graduate faculty in Physics, see this web page (<https://sgs.umkc.edu/faculty-and-staff/doctoral-graduate-faculty-lists.html>).

Admission Requirements

Applicants must meet both the general and the discipline-specific criteria for admission and be recommended for admission by the faculty review committee. Upon approval by the graduate dean, students are admitted to the School of Graduate Studies.

Please see the website (<https://sgs.umkc.edu/admissions/natural-sciences-apply.html>) for updated application deadlines.

For admission to the program, an applicant must meet the requirements of the School of Graduate Studies, the International Student Affairs Office (if applicable), and specific Physics and Astronomy admission requirements described below. The Faculty of Physics and Astronomy does not require general or subject-specific GRE scores as part of the Ph.D. application.

The graduate studies committee of the Faculty of Physics and Astronomy will review applications and make admission recommendations to the School of Graduate Studies. The basic criterion for admission is the likelihood that an applicant will be successful in the Ph.D. program, particularly in the research component of the program. All applicants must satisfy the graduate studies committee that they meet this criterion through evidence such as:

- Transcripts indicating readiness to study graduate-level physics;
- Letters of recommendation providing evidence of the student's motivation and ability to perform research and disseminate the results;
- A statement of purpose showing alignment of the student's research interests with our faculty areas of expertise as well as indicating post-graduation career goals; and
- Performance on a written Ph.D. qualifying examination if entering the program without a physics degree.

Furthermore, a member of the doctoral faculty must be willing to accept the applicant as a research student.

Core Coursework Requirements

Students with a Physics primary discipline will complete a minimum of 42 credit hours for the degree. This includes at least 15 credit hours in the primary discipline, 9 hours outside the primary discipline (decided in consultation between the student and primary advisor), 6 credit hours of electives, and at least 12 hours of dissertation credit in the primary discipline.

Primary Discipline

Code	Title	Credits
A minimum of 15 primary discipline hours, including five of the six courses below, and at least 12 dissertation hours.		15
PHYSICS 5510	Theoretical Mechanics I	
PHYSICS 5520	Electromagnetic Theory And Applications I	
PHYSICS 5521	Electromagnetic Theory And Applications II	
PHYSICS 5530	Quantum Mechanics I	
PHYSICS 5531	Quantum Mechanics II	
PHYSICS 5540	Statistical Physics I	
Coursework Outside of Primary Discipline (either in designated secondary discipline or multiple other disciplines) ¹		9
Electives (coursework can be from any discipline)		6
Dissertation		12
Total Credits		42

Total Credit Hours: 42

¹ Minimum of 9 hours with possibility of more required. Decided in consultation with primary advisor.

Secondary Discipline

Students with a Physics secondary discipline will complete a minimum of 9 credit hours in the discipline.

Code	Title	Credits
Minimum of 9 credit hours in Physics at the 300-level or above. At least 3 hours must be at the 5500-level or above.		9
Total Credits		9

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 secondary 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 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 Faculty of Physics and Astronomy; (2) Natural Sciences Ph.D. Program Director; (3) Dean of the School of Graduate Studies.

Ph.D. Examination Guidelines

Written Examination (a.k.a. Ph.D. Qualifying Exam)

During January of each year, the Faculty of Physics and Astronomy will administer a written, Ph.D. Qualifying examination of all Ph.D. students with Physics as their primary discipline who have not yet passed the exam. The two-part examination will be given during two sessions (morning and afternoon) of three hours each on the first Saturday after the start of the Spring Semester. Each part of the exam will contain approximately six questions at varying levels of difficulty (advanced undergraduate to introductory graduate). The following subject areas will be addressed in the given order by the two examination sessions:

1. Mechanics and Electromagnetism.
2. Quantum Mechanics and Thermodynamics.

Students must pass the written examination at the Ph.D. Qualifying level before being invited to take the comprehensive examination in fulfillment of the Ph.D. program requirements.

Students need only pass the written examination once. However, all graduate students in the Ph.D. program or who intend to enroll in the Ph.D. program must attempt the exam every year until they pass it. Under a limited set of extenuating circumstances (serious personal or family health issues, visa issues, etc.) a student may be granted an exception to not take the exam in a given year via a petition to the Faculty of Physics and Astronomy.

A maximum of two attempts will be permitted, and any student who does not attempt the exam when required to do so will be deemed to have failed the exam on that attempt, unless they have been given prior permission to delay taking the exam. Students who are required to take this exam are encouraged to consult with the Department of Physics and Astronomy Graduate Advisors for detailed information concerning procedures and regulations for the exam.

Ph.D. Comprehensive Exam

Ph.D. seeking students who have passed the Written Exam 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 full Ph.D. committee. This exam must be completed within 12 months of completing the coursework and the 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.

Physics as a Secondary Discipline

There are no formal qualifying or Comprehensive Examination requirements for students whose secondary discipline is Physics.