

# Physics, PhD

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To obtain the Ph.D. degree in physics, a student must satisfy all requirements of the Graduate School as well as those in the Department of Physics. The major steps toward a Ph.D. degree are as follows:

## 1. Take the necessary core courses and pass the Comprehensive Exam at the Ph.D. Level.

Required core courses for the Ph.D. degree are:

Code	Title	Semester Hours
PH 601	CLASSICAL DYNAMICS I	3
PH 607	MATHEMATICAL METHODS I	3
PH 609	MATHEMATICAL METHODS II	3
PH 621	STAT MECH KINETIC THRY I	3
PH 622	STAT MECH KINETC THRY II	3
PH 631	ELECTROMAGNETIC THEORY I	3
PH 651	QUANTUM MECHANICS I	3
PH 652	QUANTUM MECHANICS II	3
PH 732	ELECTROMAGNETIC TH II	3
Total Semester Hours		27

The Comprehensive Exam is offered every August, and covers the material in the core courses given above except PH 622 and PH 732, which are usually taken after the Exam. There are sections dealing with quantum mechanics, electromagnetic theory and relativity, and classical and statistical mechanics. A full-time course schedule leading to the Comprehensive Exam at the start of the Fall semester of the second year is listed below.

Admission to the Ph.D. program in physics is granted upon passing the Comprehensive Examination at the Ph.D. level. Students are permitted two attempts to pass the Comprehensive Examination. A student who fails on the first attempt must retake the examination the following year. Full-time students are generally expected to take the exam for the first time at the start of their second year. Further details are found on the Department's (<http://uah.edu/physics>) website.

### Year 1

Fall	Semester Hours	
PH 607	MATHEMATICAL METHODS I	3
PH 651	QUANTUM MECHANICS I	3
PH 601	CLASSICAL DYNAMICS I	3
PH 792	PHYSICS SEMINAR	1
Term Semester Hours:		10
Spring		
PH 609	MATHEMATICAL METHODS II	3
PH 652	QUANTUM MECHANICS II	3
PH 631	ELECTROMAGNETIC THEORY I	3
PH 792	PHYSICS SEMINAR	1
Term Semester Hours:		10
Summer		
PH 621	STAT MECH KINETIC THRY I	3
Elective		3
Term Semester Hours:		6
Total Semester Hours:		26

## 2. Form a supervisory committee and a Program of Study.

Once the Comprehensive Examination is passed, a student should proceed to form a supervisory committee and prepare a Program of Study. A Program of Study will consist of

- a minimum of 48 credit hours of graduate coursework. A maximum of 9 semester hours of PH 699 from a completed M.S. degree with thesis may be allowed to count toward this 48 semester hour requirement.

- three semesters of PH 792 with a grade of "S". Seminar semester hours do not count toward the 48 credit hours above.
- at least 18 semester hours of PH 799. No more than 9 of these semester hours may be taken prior to passing the Qualifying Examination (see below).

Courses in addition to those enumerated above can be selected in consultation with the student's advisory committee. Transfer of credit from other institutions requires approval of the advisory committee, the Department Chair, and the Graduate Dean.

### **3. Pass the Qualifying Examination.**

After preliminary work on their chosen Ph.D. dissertation topic, the student must then pass the Ph.D. Qualifying Examination. This examination is conducted under the auspices of the Graduate School, and tests the student's general fitness for pursuing a research project in their chosen area and their general knowledge of physics. There are written and oral components to this exam. The written part consists of the student's responses to questions submitted by their Committee; these questions can deal with the specific proposed research or the general area of research (such as optics or astrophysics, as covered, e.g., in the elective courses taken in this area). The oral part is a presentation and defense of the proposed research.

### **4. Complete and defend a research dissertation.**

Each student must complete and successfully defend a research dissertation, which must be approved by the student's supervisory committee, the Chair of the Physics Department, the Dean of the College of Science, and the Dean of the Graduate School. A significant portion of the dissertation should be submitted for publication in an approved journal with international circulation.