

# PHYSICS PHD

## Degree Requirements

The following requirements are in addition to, or further elaborate upon, those requirements outlined in The Graduate School Policy Guide (<https://catalogs.northwestern.edu/tgs/academic-policies-procedures/>).

### MS Degree Requirements for PhD Students

Students enrolled in the Ph.D. program have the opportunity to obtain a formal master's degree as they work toward completion of the Ph.D. These requirements are as follows:

- a. Completion of seven core courses in the first year
- b. Completion of five or more elective courses in the second year
- c. GPA of 3.0 or higher

## PhD

**Total Units Required: 13**

(All but electives are required for the MS degree.)

Course	Title
<b>Core Courses</b>	
PHYSICS 411-0	Classical Mechanics
PHYSICS 412-1	Quantum Mech
& PHYSICS 412-2	and Quantum Mechanics
& PHYSICS 412-3	and Quantum Mechanics
PHYSICS 414-1	Electrodynamics
& PHYSICS 414-2	and Electrodynamics
PHYSICS 416-0	Introduction to Statistical Mechanics
<b>Elective Courses</b>	
PHYSICS 411-1	Methods of Theoretical Physics
PHYSICS 420-0	Statistical Physics
PHYSICS 421-0	Introduction to Superconductivity
& PHYSICS 422-2	and Condensed-Matter Physics
& PHYSICS 422-3	and Condensed-Matter Physics
PHYSICS 424-1	Particle Physics
PHYSICS 426-0	Nonlinear Optics
PHYSICS 427-0	Quantum Optics
PHYSICS 428-1	Quantum Field Theory
& PHYSICS 428-2	and Quantum Field Theory
& PHYSICS 428-3	and Relativistic Quantum Field Theory
PHYSICS 430-0	Nonlinear Dynamics & Chaos
PHYSICS 432-1	Many-Body Theory
& PHYSICS 432-2	and Many-Body Theory
PHYSICS 434-0	Quantum Fluids, Solids, and Gases
PHYSICS 435-0	Soft Matter Physics
PHYSICS 436-0	Mesoscopic and Nanometer Scale Physics
PHYSICS 440-0	Advanced Topics in Nuclear Physics
PHYSICS 441-0	Statistical Methods for Physicists and Astronomers
PHYSICS 442-0	Advanced Topics in Particle Physics
PHYSICS 445-1	General Relativity
& PHYSICS 445-2	and General Relativity
PHYSICS 450-0	Advanced Topics in Condensed Matter
PHYSICS 460-0	Advanced Topics in Statistical Physics
PHYSICS 465-0	Advanced Topics in Nonlinear Dynamics
PHYSICS 470-0	Introduction to Biological Physics: From Molecules to Cells (IBIS 410)

PHYSICS 480-0

Advanced Topics in Atomic, Molecular, and Optical Physics

### Other PhD Degree Requirements

- **Examinations:** There is no longer a written qualifying exam. Should a student's grades in the core courses fall below a 3.0, the student will be required to sit for an oral qualifier with a chosen committee.
- **Research/Projects:** original research project of publishable quality
- **PhD Dissertation:** none specified beyond the PhD degree requirements outlined in the Current Students section of the web site
- **Final Evaluations:** none specified beyond the PhD degree requirements outlined in the Current Students section of the web site