

# Physics and Astronomy

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Graduate study is offered in the Department of Physics and Astronomy leading to the degrees of Master of Science in Physics and to the Doctor of Philosophy in Physics. Both thesis and non-thesis options are offered for the Master of Science. An interdisciplinary program leading to the degree of Doctor of Philosophy in Engineering with a concentration in Applied Physics is available. A specific program, depending on the research interest of the student, is established by consultation between the student and his/her advisor. The department requires an M.S. (either thesis or non-thesis) from Mississippi State University or another recognized university as a prerequisite for admission to the Ph.D. graduate program. The non-thesis M.S. option provides a means of enabling the Ph.D.-track student to complete graduate education in a timely manner.

Major areas of study are:

- computational physics,
- theoretical and experimental optics;
- diagnostics using the techniques of laser spectroscopy;
- experimental and theoretical nuclear structure physics;
- intermediate energy nuclear physics;
- experimental and applied electromagnetic scattering;
- astrophysics;
- astrochemistry.

Graduate research and teaching assistantships are available.

## Admission Criteria

TOEFL and IELTS scores are used following the General Requirements for Admission by the University.

## Provisional Admission

A student who has not fully met the requirements stipulated by the University and the appropriate department for admission to graduate study may be granted admission as a degree-seeking graduate student with provisional status. The student must have as his or her initial objective advancement to regular status. A student admitted provisionally is eligible for advancement to regular status after receiving a 3.00 GPA on the first 9 hours of regular graduate-level courses attempted after admission to the program. Courses with an S grade, transfer credits, or credits earned while in Unclassified status cannot be used to satisfy this requirement. If a 3.00 GPA is not attained, the provisional student may be dismissed from the graduate program.

## Academic Performance

A candidate for a degree must average B or higher on all courses attempted for graduate credit after admission to the program. No grade under C will be accepted for graduate credit; thus, a student may be terminated if he or she obtains more than two grades below a C in courses taken for graduate credit or fails to obtain a C or better in any repeated course. With the approval of the graduate coordinator and the college dean, a student may retake one course per degree, except for those approved for repeated credit (e.g. special topics, individual studies, thesis, dissertation, etc.). Both courses will remain on the permanent transcript, and both grades will be computed in final averages. This policy applies to all courses (even those not on the program of study) taken as a graduate student related to a specific program. Repeated courses must be taken at Mississippi State University. No additional program credit hours will be generated from a repeated course.

## Prerequisite and Core Courses

A Bachelor of Science in physics/physical sciences or related fields will be considered as a prerequisite for receiving graduate credit for physics and astronomy graduate courses. For additional information, contact the Graduate Coordinator (p. 1) .

## Master of Science in Physics - Thesis

### Core Courses

PH 8233	Methods of Theoretical Physics I	3
PH 8743	Quantum Mechanics I	3
Select two of the following:		6
PH 8243	Methods of Theoretical Physics II	
PH 8213	Mechanics	
PH 8313	Electromagnetic Theory	

**Other coursework** 12

### Thesis

PH 8000	Thesis Research/ Thesis in Physics and Astronomy	6
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Total Hours 30

A thesis is required.

## Master of Science in Physics - Non-Thesis

### Core Coursework

PH 8213	Mechanics	3
PH 8233	Methods of Theoretical Physics I	3
PH 8243	Methods of Theoretical Physics II	3
PH 8313	Electromagnetic Theory	3
PH 8743	Quantum Mechanics I	3
PH 8753	Quantum Mechanics II	3

**Other coursework** 12

Total Hours 30

Students must pass a written qualifying examination on the Physics core courses listed. After successfully passing the qualifying exam, non-thesis M.S. students are required to pass an oral comprehensive exam.

## Doctor of Philosophy in Physics

All Ph.D. candidates will be required to take a minimum of 20 credit hours of PH 9000 Research/Dissertation. The committee for individual students may require additional courses, depending on the research area and background of the student. All students must pass an oral preliminary examination on the proposed dissertation topic and coursework.

In addition, all Ph.D. candidates are required to demonstrate a broad background in physics by passing four written preliminary examinations given on classical mechanics, electromagnetic theory, mathematical physics, and quantum mechanics. These four exams are required for a non-thesis M.S. degree in Physics at MSU. The M.S. core curriculum is PH 8213 (Mechanics), PH 8233 (Methods of Theoretical Physics I), PH 8243 (Methods of Theoretical Physics II), PH 8313 (Electromagnetic Theory I), PH 8743 (Quantum Mechanics I), and PH 8753 (Quantum Mechanics II). These courses should be viewed as prerequisites to admission to the Ph.D. program.