

# Department of Physics and Astronomy

---

**Major Advisors: Torsten Clay, Mark Novotny, and Jeffrey Winger**

Office: 125 Hilbun Hall

Physics plays a basic role in all science and engineering disciplines. Physics is concerned with the study of the structure of matter, the nature of radiation, and the interaction of radiation and matter. Among the major branches are optical, laser, atomic, nuclear, molecular particle, condensed matter, bio-, astro-, plasma and computational physics. The B.S. program in physics provides an excellent, broadly based course of study with electives that allow the student to pursue his/her special interests in other subjects. The B.S. degree provides the necessary training for either employment in industry or government, or continued study at the graduate level.

The department also has a Physics/Pre-Medical curriculum for those students who wish to compete for admission to medical and dental schools. An applied physics curriculum is available for those who wish to work in research and development or pursue graduate work in applied physics, engineering physics or some branch of engineering. In addition, the department offers the Master of Science in physics, a Ph.D. in physics, and a Ph.D. in Engineering with a concentration in applied physics. Information may be obtained by writing the Department of Physics and Astronomy, P.O. Box 5167, Mississippi State, MS 39762. <http://physics.msstate.edu/>

A minor in physics requires 12 hours of physics at the 3000 level or above. These courses should be selected in consultation with a physics advisor.

The following is a recommended physics B.S. curriculum. Requirements for graduation are 124 hours with a GPA of at least 2.0. In addition, the student is required to maintain at least a C average in all physics courses.

## BS in Physics

### General Education Requirements

#### English Composition

EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	

#### Creative Discovery

See A&S core		3
--------------	--	---

#### Humanities

History - see A&S Core		3
Literature - see A&S Core		3

#### Social/Behavioral Sciences

See A&S core		6
--------------	--	---

#### Quantitative Reasoning

MA 1713	Calculus I	3
MA 1723	Calculus II	3
MA 2733	Calculus III	3

#### Natural Sciences

CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I	4
CH 1223 & CH 1221	Chemistry II and Investigations in Chemistry II	4

### College Requirements & Major Core

#### Foreign Language

Foreign Language I		3
Foreign Language II		3

#### Oral Communication Requirement

CO 1003	Fundamentals of Public Speaking	3
or CO 1013	Introduction to Communication	

#### Major Core

Some substitutions for required courses are possible for double majors. Student should check prerequisites for all courses. Consult advisor.

PH 1063	Descriptive Astronomy	3
PH 2213	Physics I	3
PH 2223	Physics II	3
PH 2233	Physics III	3
PH 3613	Modern Physics	3
PH 4113	Electronic Circuits for Scientists	3
PH 4143	Intermediate Laboratory	3
PH 4213	Intermediate Mechanics I	3
PH 4323	Electromagnetic Fields I	3
PH 4413	Thermal Physics	3
PH 4513	Intermediate Optics	3
PH 4152	Modern Physics Laboratory	2
PH 4713	Introduction to Quantum Mechanics	3

#### Physics Electives

6 hours; 3 hours must be above 3000 and 3 hours must be from: 6

PH 4223	Intermediate Mechanics II	
PH 4333	Electromagnetic Fields II	
PH 4723	Applications of Quantum Mechanics	

#### Required Math and Science Courses

MA 2743	Calculus IV	3
MA 3113	Introduction to Linear Algebra	3
MA 3253	Differential Equations I	3
MA 3353	Differential Equations II	3

#### Writing Requirement

GE 3513	Technical Writing	3
---------	-------------------	---

#### Computer Literacy

Choose one of the following: 3

CSE 1233	Computer Programming with C (recommended)	
CSE 1284	Introduction to Computer Programming	

#### Science and Math Electives

Consult advisor 9

#### Free Electives

Consult advisor 6

**Total Hours 124**

(31 hours must be 3000/4000 from A&S)

## Physics/Pre-Medical Curriculum

For this curriculum the required courses for the physics major are reduced by 9 hours of physics (two physics electives and PH 4413) and 3 hours of math (MA 3353). The recommended use of these 12 hours and 15 elective hours follows (check with Pre-medical advisor):

CH 4513	Organic Chemistry I	3
CH 4511	Organic Chemistry Laboratory I	1
CH 4523	Organic Chemistry II	3
CH 4521	Organic Chemistry Laboratory II	1
BCH 4013	Principles of Biochemistry	3
BIO 1134	Biology I	4
BIO 1144	Biology II	4
Choose two of the following:		8
BIO 3304	General Microbiology	
BIO 3504	Comparative Anatomy	
BIO 4504	Comparative Vertebrate Embryology	

BIO 4514	Animal Physiology	
<b>Total Hours</b>		<b>27</b>

### Applied Physics Curriculum

For this curriculum the required physics courses for the physics major are reduced by 6 hours of physics electives. The recommended use of these 6 hours and 15 elective hours follows:

PH 4333	Electromagnetic Fields II	3
or ECE 3323	Electromagnetics II	
Technical electives; consult advisor		18