PHYSICS, BS

Physics majors are interested in understanding the nature of the physical universe. This interest may focus on more specific sub-areas, such as the physics of elementary particles; the properties of solid matter; or the evolution of stars, galaxies, and black holes. A successful physics major will develop analytical and problem-solving skills which will be useful in a wide range of possible applications and careers.

Admission into the Major

Students are expected to formally declare a major no later than the fourth semester of full-time enrollment (or at 61 semester hours for transfer students). Students can declare a major by completing the Change of Major/Minor Application online under the Student tab of myBama.

Special Opportunities

The department sponsors a local chapter of the Society of Physics Students. The department also has an honors program. Students are invited to apply for admission to the honors program in physics on the basis of performance in introductory courses. Physics majors participating in the Physics Honors Program must maintain a minimum 3.3 GPA in physics courses and a 3.0 cumulative GPA. Honors students must also submit an acceptable honors thesis based on research conducted under the supervision of a faculty member in physics or astronomy and participate in an Honors Seminar course. Students can inquire at the Department of Physics and Astronomy office for further information.

Students earning the bachelor of science (BS) degree with a major in physics must complete all University, College and departmental degree requirements. These include the general education requirements, the following major requirements, all requirements for an approved minor and other sufficient credits to total a minimum of 120 applicable semester hours.

The major in physics requires successful completion of 33–41 semester hours in one of four tracks: graduate school, astrophysics, biophysics or physics education.

Grade Point Average

A 2.0 grade point average in the major is required for completion of the degree. Please see the Grades and Grade Points section of this catalog for an explanation on grade point average calculations.

Upper-level Residency

A minimum of 12 hours of 300- and 400-level courses in the major must be earned on this campus.

Ancillary Courses

Grades in ancillary courses are not computed into the major GPA. The major in physics for all tracks requires the successful completion of 23–39 semester hours of ancillary courses.

Required Minor

This major requires the completion of a minor.

Additional Major Requirements

Students are responsible for ensuring that they have met all University, college, major and minor requirements. However, each student must meet with an adviser in the major department for academic planning and to be approved for registration each semester. College advisers are also available for additional assistance with minor, college and University requirements.

Prerequisites

In addition to stated prerequisites, physics courses numbered 253-354 have as prerequisites PH 101 General Physics I, PH 105 General Physics W/Calc I or PH 125 Honors Gen Ph W/Calculus, **AND** PH 102 General Physics II, PH 106 General Physics W/Calc II or PH 126 Honors Gen Ph W/Calculus II. Physics courses numbered 400-499 have as prerequisites 14 hours of physics or 11 hours of physics and senior standing in addition to stated prerequisites.

Graduate School Prep Track

Primarily designed for students considering graduate work in physics, the graduate school track requires the successful completion of the following 36 semester hours:

Code and Title		Hours
Select one of the following:		4
PH 105	General Physics W/Calc I	
PH 125	Honors Gen Ph W/Calculus	
PH 101	General Physics I [1]	
Select one of the following:		4
PH 106	General Physics W/Calc II	
PH 126	Honors Gen Ph W/Calculus II	
PH 102	General Physics II [1]	
PH 253 & PH 255	Intro Modern Physics and Modern Physics Lab	4
PH 302	Intermediate Mechanics	3
PH 331	Elect & Magnetism I	3
PH 332	Elect & Magnetism II	3
PH 441	Quantum Structure of Matter I	3
PH 442	Quantum Structure of Matter II	3
PH 471	Thermal Physics	3
PH 491	Advanced Laboratory	3
Select three hours of PH or AY elective 300 or 400 level		3
	Credit Hours Subtotal:	36
Ancillary Courses		
Grades in ancillary courses are not computed into the major GPA. The major in physics for the graduate school track requires the successful completion of the following courses outside the major:		
CH 101 or	General Chemistry	4
CH 117	Honors General Chemistry	
CH 102 or	General Chemistry	4
CH 118	Honors General Chemistry	
MATH 125 or	Calculus I	4
MATH 145	Honors Calculus I	
MATH 126 or	Calculus II	4
MATH 146	Honors Calculus II	
MATH 227 or	Calculus III	4
MATH 247	Honors Calculus III	
MATH 238	Appld Diff Equations I	3

	Credit Hours Subtotal:	23
Total Hours		**59**

Footnotes

1 General physics with calculus (PH 105 General Physics W/Calc I and PH 106 General Physics W/Calc II, or honors PH 125 and PH 126 Honors Gen Ph W/Calculus II) is the preferred preparation for advanced physics courses. However, general physics (PH 101 General Physics I and PH 102 General Physics II) can substitute for students who must begin the major courses before taking calculus.

Astrophysics Track

Primarily designed for students interested in astronomy or space science, the astrophysics track requires the successful completion of the following 41 semester hours:

Code and Title		Hours
AY 203	Observational Astronomy	2
AY 204	Solar System Astronomy	3
AY 206	Astron Beyond Solar Syst	3
Select six hours of AY elective 300- or 400-level [1]		6
Select one of the following:		4
PH 105	General Physics W/Calc I	
PH 125	Honors Gen Ph W/Calculus	
PH 101	General Physics I [2]	
Select one of the following:		4
PH 106	General Physics W/Calc II	
PH 126	Honors Gen Ph W/Calculus II	
PH 102	General Physics II [2]	
PH 253 & PH 255	Intro Modern Physics and Modern Physics Lab	4
PH 302	Intermediate Mechanics	3
PH 331	Elect & Magnetism I	3
PH 332	Elect & Magnetism II	3
PH 441	Quantum Structure of Matter I	3
PH 471	Thermal Physics	3
Ancillary Courses		
Grades in ancillary courses are not computed into the major GPA. The major in physics for the astrophysics track requires the successful completion of the following courses outside the major:		
CH 101 or	General Chemistry	4
CH 117	Honors General Chemistry	
MATH 125 or	Calculus I	4
MATH 145	Honors Calculus I	
MATH 126 or	Calculus II	4
MATH 146	Honors Calculus II	
MATH 227 or	Calculus III	4
MATH 247	Honors Calculus III	
MATH 237	Introduction to Linear Algebra	3
MATH 238	Appld Diff Equations I	3
Total Hours		**63**

Footnotes

1 GEO 465 Planetary Science can be substituted as an AY elective. No more than 3 total credits of AY 491 and/or AY 492 can be counted towards the AY elective requirement.

2 General physics with calculus (PH 105 General Physics W/Calc I and PH 106 General Physics W/Calc II, or honors PH 125 and PH 126 Honors Gen Ph W/Calculus II) is the preferred preparation for advanced physics courses. However, general physics (PH 101 General Physics I and PH 102 General Physics II) can substitute for students who must begin the major courses before taking calculus.

Physics Education Track

This track is open to all students but is primarily designed for those who want to teach in grades K–12. Please note that this track does not lead to teacher certification. Students interested in earning teacher certification must be admitted through the College of Education. For more information, visit here.

The physics education track requires the successful completion of the following 33 semester hours:

Code and Title		Hours
Select one of the following:		4
PH 105	General Physics W/Calc I	
PH 125	Honors Gen Ph W/Calculus	
PH 101	General Physics I [1]	
Select one of the following:		4
PH 106	General Physics W/Calc II	
PH 126	Honors Gen Ph W/Calculus II	
PH 102	General Physics II [1]	
PH 253 & PH 255	Intro Modern Physics and Modern Physics Lab	4
PH 301 or	Mechanics I	3
PH 302	Intermediate Mechanics	
PH 331	Elect & Magnetism I	3
PH 354	Intermediate Modern Physics	3
PH 405	Physics For Science Teachers	3
PH 491	Advanced Laboratory	3
Select six hours of PH elective 300 or 400 level		6
	Credit Hours Subtotal:	33
Ancillary Courses		
Grades in ancillary courses are not computed into the major GPA. The major in physics for the physics education track requires the successful completion of the following courses outside the major:		
CH 101 or	General Chemistry	4
CH 117	Honors General Chemistry	
CH 102 or	General Chemistry	4
CH 118	Honors General Chemistry	
MATH 125 or	Calculus I	4
MATH 145	Honors Calculus I	
MATH 126 or	Calculus II	4
MATH 146	Honors Calculus II	
MATH 227 or	Calculus III	4
MATH 247	Honors Calculus III	
MATH 238	Appld Diff Equations I	3

	Credit Hours Subtotal:	23
Total Hours		**56**

Footnotes

[1] General physics with calculus (PH 105 General Physics W/Calc I and PH 106 General Physics W/Calc II, or honors PH 125 Honors Gen Ph W/Calculus and PH 126 Honors Gen Ph W/Calculus II) is the preferred preparation for advanced physics courses. However, general physics (PH 101 General Physics I and PH 102 General Physics II) can substitute for students who must begin the major courses before taking calculus.

Biophysics Track

Primarily designed for students planning a career in a health profession, the biophysics track requires successful completion of the following 33 semester hours:

Code and Title		Hours
Select one of the following:		4
PH 105	General Physics W/Calc I	
PH 125	Honors Gen Ph W/Calculus	
PH 101	General Physics I [1]	
Select one of the following:		4
PH 106	General Physics W/Calc II [1]	
PH 126	Honors Gen Ph W/Calculus II	
PH 102	General Physics II [1]	
PH 253 & PH 255	Intro Modern Physics and Modern Physics Lab	4
PH 301 or PH 302	Mechanics I Intermediate Mechanics	3
PH 331	Elect & Magnetism I	3
PH 354	Intermediate Modern Physics	3
PH 411	Biophysics	3
PH 491	Advanced Laboratory	3
Select six hours of PH elective 300 or 400 level		6
	Credit Hours Subtotal:	33

Ancillary Courses

Grades in ancillary courses are not computed into the major GPA. The major in physics for the biophysics track requires the successful completion of the following courses outside the major:		
Select one of the following:		4
BSC 114 & BSC 115	Principles Of Biology I and Laboratory Biology I	
BSC 118	Honors General Biology I	
Select one of the following:		4
BSC 116 & BSC 117	Principles Biology II and Laboratory Biology II	
BSC 120	Honors Gen Biology II	
CH 101 or CH 117	General Chemistry Honors General Chemistry	4
CH 102 or CH 118	General Chemistry Honors General Chemistry	4
CH 231	Elem Organic Chemistry I	3
CH 232 & CH 237	Elem Organic Chem II and Elem Organic Chem Lab	5
MATH 125 or MATH 145	Calculus I Honors Calculus I	4
MATH 126 or MATH 146	Calculus II Honors Calculus II	4
MATH 227 or MATH 247	Calculus III Honors Calculus III	4
MATH 238	Appld Diff Equations I	3
	Credit Hours Subtotal:	39
Total Hours		**72**

Footnotes

[1] General physics with calculus (PH 105 General Physics W/Calc I and PH 106 General Physics W/Calc II, or honors PH 125 and PH 126 Honors Gen Ph W/Calculus II) is the preferred preparation for advanced physics courses. However, general physics (PH 101 General Physics I and PH 102 General Physics II) can substitute for students who must begin the major courses before taking calculus.

A wide range of careers are available for people with physics degrees: academic careers in physics, astronomy, and engineering; research science in government laboratories; research and development in private industry; engineering; K-12 teaching; quantitative financial analysis for investment firms; medical research or practice; science journalism. The analytical skills developed in the course of taking a physics curriculum allow physics majors (on average) to have relatively high scores on the LSAT and MCAT admissions tests for law school and medical school. For more information, see http://www.aps.org/careers/physicists/.

Types of Jobs Accepted

Most of our recent graduates go on to graduate school in physics, engineering, astronomy, mathematics, or education. Other recent graduates have gone to medical school or law school, joined research laboratories, or become high school teachers.

Jobs of Experienced Alumni

university or college professor, engineer, research scientist in a government laboratory, researchers and developers in private industry, K-12 teacher, physician

Learn more about opportunities in this field at the Career Center