BACHELOR OF ARTS (BA) DEGREE WITH A MAJOR IN PHYSICS

Program Learning Outcomes for the BA Degree with a Major in Physics

Upon completing the BA degree with a major in Physics, students will be able to:

1. Demonstrate an understanding of fundamental concepts in Mechanics.
2. Demonstrate an understanding of fundamental concepts in Electromagnetism.
3. Demonstrate an understanding of fundamental concepts in Quantum Mechanics.
4. Demonstrate an understanding of a variety of physics topics taken from: statistical and thermal physics, biological physics, nuclear and particle physics, solid state physics, computational physics, and/or plasma physics.

Requirements for the BA Degree with a Major in Physics

For general university requirements, see Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/). Students pursuing the BA degree with a major in Physics must complete:

- A minimum of 45-47 credit hours, depending on course selection, to satisfy major requirements.
- A minimum of 120 credit hours to satisfy degree requirements.
- A minimum of 14-16 credit hours, depending on course selection, taken at the 300-level or above.
- A minimum major GPA of 2.00 or higher in all coursework that satisfies requirements for the major.

The courses listed below satisfy the requirements for this major. In certain instances, courses not on this official list may be substituted upon approval of the Physics and Astronomy department's undergraduate committee. (Course substitutions must be formally applied and entered into Degree Works by the major's Official Certifier (https://registrar.rice.edu/facstaff/degreeworks/officialcertifier/).) Students and their academic advisors should identify and clearly document the courses to be taken.

Summary

Code	Title	Credit Hours
Total Credit Hours Required for the Major in Physics		45-47
Total Credit Hours Required for the BA Degree with a Major in Physics		120

Degree Requirements

Code	Title	Credit Hours
Core Requirements		
MATH 101	SINGLE VARIABLE CALCULUS I [1]	3
or MATH 105	AP/OTH CREDIT IN CALCULUS I	
MATH 102	SINGLE VARIABLE CALCULUS II [1]	3
or MATH 106	AP/OTH CREDIT IN CALCULUS II	
MATH 211	ORDINARY DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA	3
or MATH 220	HONORS ORDINARY DIFFERENTIAL EQUATIONS	
or MATH 221	HONORS CALCULUS III	
MATH 212	MULTIVARIABLE CALCULUS	3
or MATH 222	HONORS CALCULUS IV	
or MATH 232	HONORS MULTIVARIABLE CALCULUS	
Select 1 from the following: [2]		*4*
PHYS 101 & PHYS 103	MECHANICS (WITH LAB) and MECHANICS DISCUSSION	
PHYS 111	HONORS MECHANICS (WITH LAB)	
Select 1 from the following: [3]		*4*
PHYS 102 & PHYS 104	ELECTRICITY & MAGNETISM (WITH LAB) and ELECTRICITY AND MAGNETISM DISCUSSION	
PHYS 112	HONORS ELECTRICITY & MAGNETISM (WITH LAB)	
PHYS 201	WAVES, LIGHT, AND HEAT	3
PHYS 202	MODERN PHYSICS	3
PHYS 231	ELEMENTARY PHYSICS LAB	1
PHYS 311	INTRODUCTION TO QUANTUM PHYSICS I	3
Select 2 courses from the following:		*6-8*
PHYS 301	INTERMEDIATE MECHANICS	
PHYS 302	INTERMEDIATE ELECTRODYNAMICS	
PHYS 312	INTRODUCTION TO QUANTUM PHYSICS II	
PHYS 355	INTRODUCTION TO BIOLOGICAL PHYSICS	
PHYS 411	INTRODUCTION TO NUCLEAR AND PARTICLE PHYSICS	
PHYS 416	COMPUTATIONAL PHYSICS	
PHYS 425	STATISTICAL & THERMAL PHYSICS	
PHYS 480	INTRODUCTION TO PLASMA PHYSICS	
Select 6 additional credit hours of departmental (PHYS) or (ASTR) courses at the 300-level or above. [4]		*6*
Select 1 course from the following:		*3*
CMOR 220	INTRODUCTION TO ENGINEERING COMPUTATION	
1 course from Computational Applied Mathematics and Operations Research (CMOR) course offerings at the 300-level or above.		
1 course from Mathematics (MATH) course offerings at the 300-level or above.		
Total Credit Hours Required for the Major in Physics		**45-47**

Additional Credit Hours to Complete Degree Requirements *	42-44
University Graduation Requirements (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/graduation-requirements/) *	31
Total Credit Hours	**120**

Footnotes and Additional Information

* **Note:** University Graduation Requirements include 31 credit hours, comprised of Distribution Requirements (Groups I, II, and III), FWIS, and LPAP coursework. In some instances, courses satisfying FWIS or distribution requirements may additionally meet other requirements, such as the Analyzing Diversity (AD) requirement, or some of the student's declared major, minor, or certificate requirements. Additional Credit Hours to Complete Degree Requirements include general electives, coursework completed as upper-level, residency (hours taken at Rice), and/or any other additional academic program requirements.

1 Students without credit for basic calculus (e.g. MATH 101/MATH 105 and/or MATH 102/MATH 106) must either enroll in the relevant course(s) or substitute more advanced MATH or CMOR coursework, with prior approval by the Physics and Astronomy department's Undergraduate Program Committee, to earn the required credit.

2 The Physics department has determined that credits awarded for PHYS 125 *GENERAL PHYSICS (WITH LAB)* or PHYS 141 *CONCEPTS IN PHYSICS I* are not eligible for meeting the requirements of the Physics major.

3 The Physics department has determined that credits awarded for PHYS 126 *GENERAL PHYSICS II (WITH LAB)* or PHYS 142 *CONCEPTS IN PHYSICS II* are not eligible for meeting the requirements of the Physics major.

4 Includes PHYS 332 and PHYS 461, but does not include PHYS 491, PHYS 492, PHYS 493, or PHYS 494.

Policies for the BA Degree with a Major in Physics

Program Restrictions and Exclusions

Students pursuing the BA Degree with a Major in Physics should be aware of the following program restrictions:

- As noted in Majors, Minors, and Certificates (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/) under *Declaring Majors, Minors and Certificates*, students may not obtain both a BA and a BS in the same major. Students pursuing the BA Degree with a Major in Physics may not additionally pursue the BS Degree with a Major in Physics.
- Students pursuing the BA Degree with a Major in Physics may not additionally declare the major in Chemical Physics.
- As noted in Majors, Minors, and Certificates (https://ga.rice.edu/undergraduate-students/academic-opportunities/majors-minors-certificates/), students may not major and minor in the same subject.
- Students pursuing the major in Physics may not additionally declare the minor in Physics.

Transfer Credit

For Rice University's policy regarding transfer credit, see Transfer Credit (https://ga.rice.edu/undergraduate-students/academic-policies-procedures/transfer-credit/). Some departments and programs have additional restrictions on transfer credit. Requests for transfer credit must be approved for Rice equivalency by the designated transfer credit advisor for the appropriate academic department offering the Rice equivalent course (corresponding to the subject code of the course content). The Office of Academic Advising maintains the university's official list of transfer credit advisors (https://oaa.rice.edu/advising-network/transfer-credit-advisors/) on their website: https://oaa.rice.edu. Students are encouraged to meet with the applicable transfer credit advisor as well as their academic program director when considering transfer credit possibilities.

Additional Information

For additional information, please see the Physics and Astronomy website: https://physics.rice.edu/.

Opportunities for the BA Degree with a Major in Physics

Academic Honors

The university recognizes academic excellence achieved over an undergraduate's academic history at Rice. For information on university honors, please see Latin Honors (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/) (*summa cum laude*, *magna cum laude*, and *cum laude*) and Distinction in Research and Creative Work (https://ga.rice.edu/undergraduate-students/honors-distinctions/university/). Some departments have department-specific Honors awards or designations.

Research in the Department of Physics and Astronomy

The Physics and Astronomy Department encourages undergraduate participation in research, both within the department and through extramural programs. For current opportunities, please click on the *Research* tab on the department website (https://physics.rice.edu/).

Additional Information

For additional information, please see the Physics and Astronomy website: https://physics.rice.edu/.