

PHYSICS, BACHELOR OF SCIENCE - PHYS

Program Description

The program in physics allows students to investigate the microscopic and the macroscopic through courses covering topics such as astronomy, nuclear physics, classical mechanics, modern physics, and quantum mechanics.

The B.S. in Physics is a curriculum designed to prepare students for graduate school in physics. The B.S. in Physics also provides adequate preparation for traditional physics professions in the private sector, the military, academia and national laboratories. Physicists work in industries including construction, education, energy, defense, finance, law, medical, music, space, sports, television, transportation, and even video game development.

For those interested in a career in aerospace, structural civil, electrical, or mechanical engineering, the degrees offered in Physics, both B.A. and B.S., nicely complement the Five-Year Dual Degree Program in Engineering with the University of Notre Dame.

Major Requirements (61 Hours)

Code	Title	Credits
Required		
PHYS 121	General Physics I: Mechanics and Waves	4
PHYS 122	General Physics II: Temperature, Electricity, and Light	4
PHYS 253	General Physics III: Modern Physics	3
PHYS 323	Classical Mechanics	3
PHYS 343	Thermodynamics	3
PHYS 424	Quantum Mechanics	3
PHYS 444	Electricity and Magnetism	3
PHYS 495	Senior Seminar	1
Select two of the following:		2
PHYS 272L	Computational Physics Laboratory	
PHYS 282L	Modern Experimental Laboratory	
PHYS 292L	Wave Mechanics Laboratory	
Required Supporting Courses		
CHEM 121 & 121L	Principles of Chemistry I and Principles of Chemistry I Laboratory	4
CHEM 122 & 122L	Principles of Chemistry II and Principles of Chemistry II Laboratory	4
CPSC 207	Computer Programming	3
MATH 131 & MATH 132 or MATH 133	Calculus I and Calculus II for STEM majors Theory and Application of Calculus	8
MATH 231	Calculus III	4
MATH 326	Linear Algebra and Differential Equations	4
Elective Courses		
Select additional 200+ level technical electives in science, computer science, mathematics, or engineering to total 60 credit hours		8
Total Credits		61

Senior Comprehensive

The Senior Comprehensive requirement in Physics is fulfilled by successfully completing two presentations, one in a poster format and one 15 minute oral presentation. Both are given in the second semester of the senior year and include a question and answer period with faculty. The topic of the presentation may be based on experimental laboratory research performed at Saint Mary's or at another institution, or literature research on an approved topic. Emphasis is placed on explaining the physics of the research. An abstract of the topic is also required prior to the oral presentation.

Advanced Writing Proficiency

Each student writes a formal paper consisting of a technical discussion of the relevant physical principles, mathematics and methods related to her oral comprehensive presentation. These are normally submitted during the first semester of the senior year.

Student Learning Outcomes

Upon graduation, students will be able to:

- **create** a conceptual framework for modeling a system using laws of nature, physical principles, and other practical constraints.
- **produce** concise solutions to physical problems.
- **apply** knowledge of physics and mathematics to real world situations.
- **demonstrate** essential research skills including: practicing laboratory safety and performing error analysis.
- critically **evaluate** scientific literature.
- effectively **communicate** scientific results.