

# Bachelor of Science with a Major in Physics

## Selected Educational Outcomes

The program leading to the Bachelor of Science degree with a major in physics is designed to prepare students to enter graduate programs in physics or in astronomy, or to embark upon careers in government, industry, or education. Examples of these outcomes include the following:

1. students will demonstrate knowledge in the fundamental branches of physics: mechanics, electromagnetism, and quantum mechanics;
2. students will demonstrate knowledge in several elective areas within the field of physics, including (but not limited to) thermodynamics, electronics, optics, and computational physics;
3. students will apply the techniques of mathematical analysis (algebra, geometry, trigonometry, and calculus) to physical problems;
4. students will effectively use computers and calculators for scientific calculation, programming, and word processing.

## Examples of Outcome Assessments

Assessment of the education outcomes for the physics major is primarily the responsibility of the departmental Physics Area Committee, comprised of faculty with expertise in physics and cognate disciplines. The Committee assesses the extent to which the program requirements create the desired outcomes by using a variety of techniques. Examples of these assessments include the following:

1. All student majors must make oral presentations of their research results to the departmental faculty and submit written copies of their research papers to the departmental office as part of the required Capstone Seminar (PHYS 4501).
2. Students must submit a departmental copy of their portfolios of undergraduate coursework, research projects, and professional activity at the end of their last semester of residence.
3. At the time of major coursework completion, students must complete an exit questionnaire to determine the students' perception of achievement of the major's educational outcomes.
4. Periodic surveys of alumni who have completed the physics program will be conducted to evaluate the relevancy of the major program to graduates' present employment, their perception of success, and their personal satisfaction with the program. The surveys will also solicit suggestions for improvement of the physics major program.

## Requirements for the Bachelor of Science Degree with a Major in Physics

<b>Core Curriculum</b>		60
Core Curriculum Areas A-E (See VSU Core Curriculum)		42
Physics majors are required to take MATH 1113 in Area A and MATH 2261 in Area D2. They are advised to take PHYS 2211K, PHYS 2212K in Area D2.		
<b>Core Curriculum Area F</b>		
MATH 2261	Analytic Geometry and Calculus I (1 hour left over from Area D)	
MATH 2262 & MATH 2263	Analytic Geometry and Calculus II and Analytic Geometry and Calculus III	
PHYS 2700	Modern Physics	
PHYS 2211K & PHYS 2212K	Principles of Physics I and Principles of Physics II (if not taken in Area D2)	
Lab Sciences, if PHYS 2211K, PHYS 2212K are taken in Area D2		
<b>Senior College Curriculum</b>		60
Upper-Level Courses in Physics		
PHYS 3810	Mathematical Methods of Physics	3
PHYS 4040	Experimental Physics	4
PHYS 4111 & PHYS 4112	Theoretical Mechanics I and Theoretical Mechanics II	6
PHYS 4211 & PHYS 4212	Electromagnetism I and Electromagnetism II	6
PHYS 4310	Thermodynamics	3
PHYS 4411 & PHYS 4412	Quantum Mechanics I and Quantum Mechanics II	6
MATH 3340 or PHYS 3800	Ordinary Differential Equations Differential Equations in Physical Systems	3
Select two courses from the following:		8

PHYS 3040	Electronics	
PHYS 3100	Optics	
PHYS 3820	Computational Physics I	
Other Supporting Courses		6-9
MATH 2150	Introduction to Linear Algebra	3
Language Requirement (3 hours may be taken in Area C)		3-6
Guided Electives (must include at least one MATH course) <sup>1</sup>		12-15
<b>Total hours required for the degree</b>		<b>120</b>

<sup>1</sup> chosen from: MATH 3040, MATH 3600, MATH 4081, MATH 4082, MATH 4110, MATH 4150, MATH 4260, MATH 4300, MATH 4540, MATH 4621, MATH 4622, MATH 4651, MATH 4652, ASTR 3400, ASTR 3800, ASTR 4101, ASTR 4400, ASTR 4410, PHYS 3821, PHYS 4300, PHYS 4800, PHYS 4900, PHYS 4950