Bachelor of Science with a Major in Astronomy

The program leading to the Bachelor of Science degree with a major in astronomy is designed to prepare students to enter graduate programs in astronomy, physics, or related disciplines, or to embark upon careers in research laboratories and observatories, government, industry, or education. Specific educational outcomes include the following:

Selected Educational Outcomes

1. students will demonstrate knowledge in the of the historical context from which astronomy has arisen, from the developments of ancient civilizations through the Renaissance;
2. students will develop interdisciplinary skills for studying planets and other small bodies using the supporting scientific branches of physics, chemistry, geology, and biology;
3. students will build knowledge regarding the birth, evolution, and death of stars using theoretical, observational, and numerical methods;
4. students will establish a working knowledge of techniques used for laboratory applications, telescope operations, and the planetarium;
5. students will conduct observational and/or theoretical research into astronomical systems;
6. students will apply the techniques of mathematical analysis to complex systems and develop an interdisciplinary perspective.

Examples of Outcome Assessments

Assessment of the educational outcomes for the astronomy major is primarily the responsibility of the departmental Astronomy Area Committee, comprised of faculty with expertise in astronomy and cognate disciplines. This assessment is conducted through evaluation of the major educational outcomes in relation to astronomy programs at comparable institutions (particularly the member institutions of SARA). 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 will complete a research project with a faculty mentor demonstrating the proficiency in either observational or computational techniques.
2. All student majors will make presentations of their research results at the annual VSU Undergraduate Research Symposium, the Annual Meeting of the Georgia Academy of Science, and/or and equivalent meeting.
3. Students will submit a departmental copy of their portfolios of undergraduate coursework, research projects, and professional activity at the end of their last semester of residence.
4. At the time of major coursework completion, students will complete an exit questionnaire to determine the students' perception of achievement of the major's educational outcomes.
5. Periodic surveys of alumni who have completed the astronomy program will be conducted. These surveys will 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 astronomy major program.

Requirements for the Bachelor of Science Degree with a Major in Astronomy

Code	Title	Hours
Core Curriculum		**60**
Core Curriculum Areas A-E (See VSU Core Curriculum)		42
Astronomy majors are required to take Pre-calculus (MATH 1113) in Area A and Calculus I (MATH 2261) in Area D and are advised to take 3 hours of a foreign language in Area C, and PHYS 2211K and PHYS 2212K in Area D2		
Core Curriculum Area F		
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	
ASTR 1010K & ASTR 1020K	Astronomy of the Solar System and Stellar and Galactic Astronomy	
ASTR 2010	Tools of Astronomy	
Senior College Curriculum		**60**
Upper-Level Courses in Astronomy		
ASTR 4101	Observational Techniques I	4
ASTR 4400 & ASTR 4410	Physics of the Solar System and Astrophysics	6
Upper-Level Supporting Courses in Physics and Mathematics		
PHYS 2700	Modern Physics	1

MATH 2150	Introduction to Linear Algebra	3
MATH 3340	Ordinary Differential Equations	3
or PHYS 3800	Differential Equations in Physical Systems	
PHYS 3810	Mathematical Methods of Physics	3
PHYS 4111 & PHYS 4112	Theoretical Mechanics I and Theoretical Mechanics II	6
PHYS 4211 & PHYS 4212	Electromagnetism I and Electromagnetism II	6
PHYS 4411 & PHYS 4412	Quantum Mechanics I and Quantum Mechanics II	6
Select one of the following:		4
PHYS 3040	Electronics	
PHYS 3100	Optics	
PHYS 3820	Computational Physics I	
PHYS 4040	Experimental Physics	
Other Supporting Courses		
Language Requirement (3 hours may be taken in Area C)		3-6
Guided Electives--Select from the following:		12-15
ASTR 3220	Cosmology	
ASTR 3400	Planetary Geology	
ASTR 3800	Astrobiology	
ASTR 4900	Special Topics in Astronomy	
MATH 3040	Set Theory	
MATH 3600	Probability and Statistics	
MATH 4081	Modern Algebra I	
MATH 4082	Modern Algebra II	
MATH 4150	Linear Algebra	
MATH 4300	Functions of a Complex Variable	
PHYS 3040	Electronics	
PHYS 3100	Optics	
PHYS 3820	Computational Physics I	
PHYS 3821	Computational Physics II	
PHYS 4040	Experimental Physics	
PHYS 4300	Plasma Physics	
PHYS 4310	Thermodynamics	
Total hours required for the degree		**120**