DEPARTMENT OF PHYSICS

COLLEGE OF ARTS AND SCIENCES

Faculty

William Nettles (2006). Professor of Physics, Department Chair, and Associate Dean of the College of Arts and Sciences. B.S., Mississippi College; M.S., and Ph.D., Vanderbilt University.

Ildefonso Guilaran(2008). Associate Professor of Physics. B.S., Western Kentucky University; M.S. and Ph.D., Florida State University.

Geoffrey Poore(2010). Assistant Professor of Physics. B.A., Wheaton College; M.S. and Ph.D., University of Illinois.

David A. Ward (1992, 1999). Professor of Physics, B.S. and M.A., University of South Florida; Ph.D., North Carolina State University.

Staff

Christine Rowland (2006). Academic Secretary—Engineering, Physics, Math, and Computer Science.

Curriculum

The programs offered by the Department of Physics are designed to help students understand the physical world by examining the laws which describe the interactions throughout the universe, the methods by which the cosmos can be studied, and the relationship of physics to other aspects of human experience. The department offers courses that effectively serve all students within the institution, recognizing that each student's needs and career goals may be different. The curriculum is designed to provide content of the appropriate level and diversity for students classified as physics majors/minors, non-science majors, engineers, pre-professionals, and those preparing for a teaching career in secondary school. The faculty endeavor to create an atmosphere in which students are challenged to acquire problem-solving skills using advanced mathematics and modern methods in science. Students are encouraged to develop in-depth analytical skills and an attitude of scientific curiosity while maintaining a Christian worldview. In summary, the physics curriculum provides liberal arts students with a working knowledge of science and meets the career needs of students who wish to:

- pursue a teaching career in elementary or secondary school;
- enter engineering, one of the health professions, or an allied health field;
- become a professional/industrial physicist; or
- continue study of physics or a related field at the graduate level.

I. Major in Physics—38 hours
   A. Physics 231-232, 311, 313, 314, 420, 424, 430 (1-3 hours), 498—28–30 hours
   B. Select three or more courses: PHY 262, 325, 350, 360, 395-6-7*, 400, 410, 417, 425 (1-2 hours**), 495*
   C. Prerequisites: MAT 211, 212, 213, 314

Assessment of Major

All Physics majors are required to take a research class, PHY 424, and a seminar class, PHY 498, in which presentations are made and students are questioned orally. Seniors must also take the Major Field Examination in physics and if seeking teacher licensure, complete the required education tests such as PRAXIS.

Student Organizations

The Society of Physics Students (SPS) stimulates an awareness of physics and the related sciences, and acquaints students with professional opportunities within the discipline. The organization promotes professionalism and pride in the physical sciences and assists students in studying, preparing, and presenting technical material. Membership is open to any student interested in physics.

Student Awards

The Physics Research Award is given by the faculty of the Department of Physics to the student who presents the best research paper of the year. The research must have been an original work and must be presented at a state, regional, or national professional meeting prior to the graduation.

The FreshmaT1_2 1 Tf 04Pht6jDv0.8(ds)]j_2 1 Tf 0.119 Tw 10 0 0

314. Intermediate Electricity and Magnetism (3)
Prerequisites: MAT 212 and PHY 232.
Electric and magnetic fields both in media and a vacuum. Maxwell's equations are used to determine electromagnetic fields produced by a variety of charge and current distributions.

325. Thermodynamics and Statistical Mechanics (3)
Prerequisites: MAT 212 and PHY 232.
An intermediate survey of heat and thermodynamics including the concepts of temperature and heat, the laws of thermodynamics, thermodynamics potentials, the Maxwell relations and statistical methods applied to the thermodynamics of various states of matter, including gases, liquids, and quantum fluids.

350. Introduction to Astrophysics (3)
Pre-requisite: PHY 232
An introduction to the behaviors of solar systems, stars, and galaxies. Newtonian celestial mechanics, gravitation, simple nuclear physics, and introductory cosmology will be included.

360. Mathematical Methods in Physics (3)
Prerequisites: MAT 213, PHY 232.
Special differential equations, complex number analysis, linear algebra, group therapy and Fourier analysis applied to advanced topics in physics.

400. Optics and Lasers (3) S
Prerequisites: MAT 213, PHY 232.
Analyzes the behavior of electromagnetic radiation, emphasizing geometrical optics and instrumentation. The role of optics in spectroscopic measurements will be highlighted by discussing polarization and diffraction. Includes an introduction to laser physics and operations using systems, including excimer and neodymium-YAG lasers.

410. Nuclear Physics (3)
Prerequisites: MAT 213 and PHY 311.
A study of the atomic nucleus, including its constituents, interactions and energies. Radiative processes, angular momentum, and practical applications such as astrophysics, medical physics, energy production, and environmental physics.

417. Introduction to Condensed Matter Physics (3)
Pre-requisite: PHY 311
An introduction to properties of various phases of matter from the macroscopic scale down to the atomic. The topics covered in this course will include crystal structure, the reciprocal lattice, structural analysis techniques (wave diffraction), the historical progression and theories of various models of electrical conduction, energy bands,