DEPARTMENT OF PHYSICS
COLLEGE OF ARTS AND SCIENCES

Faculty

William Nettles (2006). University 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). Professor of Physics. B.S., 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.

   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
   *Must be approved Special/Independent Studies
   **Maximum 3 hours from 424 and 425 apply to major.

II. Major in Physical Science 44 hours
   A. CHE 111, 112, 113, 211, 221—15 hours
   B. PHY 112, 231-32, 311, 310 or 301—22 hours
   C. Upper Level Electives from CHE and PHY—7 hours; maximum 1 hour from 424 and 1 from 498

III. Major in Physics with Discipline-Specific Honors

Students who are pursuing a major in physics have the option of completing an honors program in the discipline. Students who are interested in this Honors program should refer to the general requirements for Discipline-Specific Honors (DSH) as well as the requirements for the program in physics below:

- To apply for admission to the Physics DSH program students must
  - have at least a sophomore standing,
  - have a cumulative 3.5 GPA on 15 or more credit hours,
  - be enrolled in or have completed PHY 311, and
  - have at least three, and preferably four, semesters remaining in their undergraduate career.
- Application should be made to the Chair of the Department of Physics and must be approved by the Department of Physics. Upon departmental approval, the application will be sent to the Honors Community leadership for final approval.
- Physics DSH Students must complete all requirements for the major in physics. In addition, the student must complete DSH requirements established by the Honors Community.
- Physics DSH students must complete 12 credit hours of honors-contract courses in physics: Physics Research (PHY 424-425) plus three additional upper-division courses:
  - Three credit hours total must be obtained under an honors contract in the physics research courses (PHY 424 and/or 425). The research must be done within an ongoing research project either at Union or at an off-campus research site. Research Experience for Undergraduates (REUs) are ideal for this requirement. Students must present a paper and a talk which will be evaluated by departmental faculty and must meet high standards of excellence. The department maintains a rubric for evaluating these. The research must be presented at the Union University Scholarship Symposium or its successor. The student must make a good faith effort to present the research at a regional or national meeting.

  - The remaining nine credit hours of upper-division honors contract must be above PHY 311 and have a minimum prerequisite of PHY 232.
  - Honors contract work will consist of writing a review article on a relevant topic, preparing and giving one or more presentations on relevant topics, completing additional homework of a particularly advanced and challenging nature, designing a physical or computational experiment for a course that does not include a lab component, or a similarly demanding project approved by the department.
  - PHY 498 (Seminar) may be taken for 3 hours of honors contact. Only honors students may take this course for more than 1 credit hour.
- Physics DSH students must attend at least four regularly scheduled honors colloquia during each of the student's junior and senior years. Students who are only in Physics DSH for three semesters must attend two colloquia per semester for an overall total of at least six colloquia. Within one week of attending a colloquium, the student will submit a short written summary and reflection paper to the student's honors advisor.
- A grade of C or below in any honors contract course will result in a student's re-evaluation by the department. In the absence of extenuating circumstances, the department will typically dismiss the student from the program. If a student receives

Course Offerings in Physics (PHY)

( ) Hours Credit; F-Fall; W-Winter; S-Spring; Su-Summer

111. Principles of the Physical Sciences (4) F, W, S
Introduction to physics and chemistry for non-science majors