

## Options in Physics and Astronomy 2020-2021

There are several different physics and astronomy courses that are available for new students, depending on their background, academic interests and prospective majors.

Most majors in science and engineering require either PHYS 101/102 or PHYS 111/112 as preparation for later courses. A few programs recommend or allow PHYS 125/126. In choosing a physics sequence students must consider all likely academic paths at Rice and afterwards, as course substitutions are not generally allowed. It is also recommended that physics be taken during the first year, although it may be possible to delay until second year for some tracks. If there is any doubt about course selection or timing, consult with an academic advisor.

### *Introductory Physics Courses*

#### PHYS 101/103 (Fall) and 102/104 (Spring)

These courses cover mechanics, electricity, and magnetism for students intending to major in one of the physical science or engineering disciplines. They use calculus, so previous or concurrent enrollment in MATH 101 and 102, or their equivalents, is assumed. Laboratory work is included in the course.

#### PHYS 111 (Fall) and 112 (Spring)

These are enriched versions of PHYS 101/102, intended for students who are particularly well-prepared and well-motivated. They cover the same material in somewhat greater depth, with a few brief excursions into more advanced topics. Laboratory work is part of the course.

Students who already have AP credit (C tests) for PHYS 101 and 102, and who decide not to go straight to PHYS 201, should consider taking PHYS 111. Students without AP credit, but with a very strong high-school background in physics and mathematics, also should consider taking PHYS 111 in place of PHYS 101, especially if they intend to pursue a major in physics or a closely related field. However, it is not in any way obligatory for prospective physics majors to take 111 rather than 101. Indeed, prospective physics majors whose high-school preparation is not strong may be better advised to take 101. Anyone interested should consult the instructor, Professor Mustafa Amin, to verify that their background and preparation is adequate to succeed in the course.

#### PHYS 125 (Fall) and PHYS 126 (Spring)

These are survey courses primarily intended for students in the biosciences and bioengineering. They are also the recommended physics courses for pre-medical students, unless their major requires PHYS 101/102. Previous or concurrent enrollment in MATH 101 and 102 (calculus), or their equivalents, is assumed. Laboratory work is included in the course.

#### PHYS 201 (Fall)

Students who have AP credit (C tests) for both PHYS 101 and 102 are allowed to enroll in PHYS 201 but they are encouraged to consider PHYS 111/112. Students who do want to take PHYS 201 are strongly advised to contact the instructor, Professor Barry Dunning, to verify that their background and preparation is adequate to succeed in the course.

## *General Interest Courses*

### ASTR 100 (Spring)

*Exploring the Cosmos* is an introduction to concepts, methods and discoveries of astronomy and astrophysics, with a theme to be chosen from the frontier topics of modern astrophysics. Will emphasize student presentations. Designed for first year students interested in science or engineering, but other majors are welcome.

### ASTR 101 (Fall, Spring)

*Stars, Galaxies and the Universe* is an introductory course for students in academic programs. It will consider the formation, evolution, and death of stars; the composition and evolution of galaxies; the structure and evolution of the universe. Very little mathematics is assumed. (Formerly ASTR 201)

### ASTR 102 (Fall)

*Exploration of the Solar System* is an introductory course for students in academic programs, surveying the sun, planetary motions, interplanetary fields and plasmas, the planets, their satellites and rings, and comets. The purposes and methods of manned and unmanned solar system exploration are also discussed. Very little mathematics is required. (Formerly ASTR 202)

### PHYS 100 (Spring)

*Doing Physics with a Computer* Learn the basic skills necessary to use a computer to explore and solve physics problems that are either unwieldy or difficult to solve with pencil and paper alone.

*Quantum Physics for Regular People* will attempt the impossible—we will attempt to understand the conceptual foundations of quantum mechanics. To add to the difficulty (and fun!) we will do so without using any more mathematics than a regular person would understand.

### FWIS ??? (Spring)

*Science, Pseudoscience and Skepticism: How to Tell Good Science from Junk Science*  
This class focuses on scientific skepticism and critical thinking, and how they can be utilized to distinguish science from pseudoscience. Core topics include the fallibility of perception; mechanisms of self-deception; as well as metacognition, cognitive biases and logical fallacies. These topics will be illustrated through examples of good and bad science.