

# SYLLABUS: ELEMENTS OF PHYSICS I

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<b>Instructor:</b>	Hunter King	<b>Email:</b>	<a href="mailto:h.king@rutgers.edu">h.king@rutgers.edu</a>
<b>Time:</b>	TTh 3:35 – 4:55pm	<b>Place:</b>	CNS-201

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## Course Information

### Course Description:

This is the first of two calculus-based introductory physics courses typically taken by Engineering, Physics, Computer Science, and Chemistry majors. During the course of this semester, you will become familiar with the fundamental principles that determine the motion of objects and continua. Algebra, calculus, geometry, and trigonometry will be used to solve physical problems pertaining to realistic systems. Students will also be introduced to the practice of using mathematics to describe physical phenomena and as a tool to make predictions.

**Learning goals** are to:

- Use a strategic approach to problem solving:
  1. Analyze the problem (draw sketches, collect available information, assign variables)
  2. Identify appropriate physics concepts and express them as analytical equations.
  3. Manipulate the equations and solve for the desired quantity.
  4. Perform a numerical evaluation including appropriate units.
  5. Validate the result (check units, compare with expectation, consider limits)
- Communicate your knowledge mathematically, verbally, and graphically.

**Prerequisite:** None

**Corequisite:** 50:640:121 Calculus 1 -AND- 50:750:133 Lab 1

**Textbook:** *Physics for Scientists and Engineers*, 4th edition, by D. C. Giancoli

**Office hours / review sessions:** TBD

### Class policies:

- Please make every effort to attend class in-person and on-time.
- Please put completely away mobile phones for the extent of class time.

**Topic outline:**

Week	Topic	Chapters	note
9/2 9/9 9/16 9/23	Kinematics, Vectors, Dynamics, Newton's Laws	1-5	9/26 Exam I
9/30 10/7 10/14 10/21	Gravitation, Work and Energy, Conservation of Energy, Linear Momentum, Collisions	6-9	10/24 Exam II
10/28 11/4 11/11 11/18	Rotational Motion, Angular momentum, Oscillations, Elasticity, Fluids	10-14	11/21 Exam III
11/25 12/2 12/9	Temperature, Kinetic Theory of Gases, Thermodynamics, Ideal Gas Processes, Heat Engines	17-20	
12/16		all above	Final exam

**Breakdown of final grade:****1. Weekly homework assignments (30%).**

- Individual component (25%):  
Short answer and multiple choice problems on [theexpertta.com](http://theexpertta.com). Follow this link to register and pay: <http://goeta.link/USP32NJ-F18BF0-1SZ>.
- Group component (5%):  
Single problem to solve collaboratively (showing work)

You are encouraged to discuss the problems with each other and me, but work you submit for a grade must be your own (or group's).

**2. Preclass Quizzes (10%):**

Weekly quizzes on Canvas about material in the textbook that you will read **before it is discussed in class**. The first quiz is due 3:30 p.m. Tuesday, September 10, and covers chapters 1 and 2.

**3. Midterms (40%):**

In class, on the Thursday at the end of each unit, covering topics within the unit. **No makeup exams**. Best two of three accepted for average.

**4. Final exam (20%):**

**Comprehensive** exam in person during finals week. The content will cover content from the entire course (with somewhat greater weight placed on the more recent material that had not appeared in the previous midterms).