

Cornell University

Department of Physics

Physics 1116

September 7, 2024

Fall 2024

Physics I: Mechanics and Special Relativity

Course Information

Prerequisites: AP Calculus BC or Math 1910 or Math 1120 or Equivalent experience. AP Physics BC, or at least one year of other high-school physics + high motivation.

Corequisites: Co-enrollment in Physics 1110 is required.

Lecturer: Prof. Maxim Perelstein, PSB 471, x5-5151 (mp325@cornell.edu).

Teaching Assistants:

Ms. Margarita Gavrilova, mg2333@cornell.edu

Mr. Chinh-San Sieng, cs2284@cornell.edu

Class Times and Locations: Attendance is mandatory at lectures and the section you're registered for.

Lectures: Mon/Wed/Fri 10:10-11:00 am, Rock 230 (Prof. P.)

Section 1: Tue/Thu 9:05-9:55 am, Rock 103 (TA Gavrilova)

Section 2: Mon/Wed 12:20-1:10 pm, Rock 103 (TA Gavrilova)

Section 3: Mon/Wed 1:25-2:15 pm, Rock 103 (TA Sieng)

Section 4: Mon/Wed 2:30-3:20 pm, Rock 103 (TA Sieng)

Study Halls: Also known as “problem-solving parties”. Opportunity to work on problem sets collaboratively with classmates. TAs and Undergraduate Learning Assistants (LAs) will be on hand to help. Attendance is optional, you can go to one or both, no sign-up required.

Study Hall 1: Thu 5-7 pm, Clark 294 E (TA Gavrilova)

Study Hall 2: Fri 5-7 pm, Clark 294 E (TA Sieng)

Professor office hours: Get help with conceptual understanding or broader questions. Tuesdays 1-3 pm, or by appointment (use email).

Textbook: *An Introduction to Mechanics* by Kleppner and Kolenkow (2nd edition). Reading assignments from the book will be included in each problem set, and must be taken seriously.

Homework: There will be one problem set per week. The problem sets will be posted on Canvas. Solutions will be turned in electronically on Canvas before the due date/time indicated on each problem set. **Late homework will not be accepted.** If running late, turn in what you have by the deadline to maximize partial credit. Homework will be graded based primarily on effort. One

lowest-score (or missing) HW will be dropped from the final grade calculation.

Homework Quiz: For each problem set, a short quiz will be given in the first section after the problem set due date. The quiz will consist of one problem from the problem set, with (at most) a minor modification. Quiz is closed-book, closed-notes. Quizzes will be graded based on correctness and effort. One lowest-score quiz (two if participating in pre-/post-test surveys) will be dropped from the final grade calculation.

Academic Integrity: Each student in the course is expected to abide by the Cornell University Code of Academic Integrity. Some items of particular importance for this class are: Homework solutions must represent the student's own work. Discussing problems with other students, TAs and LAs is allowed (in fact encouraged), but written solutions should be done independently and reflect your own understanding. Copying solutions from any source is forbidden.

Exams: There will be two written Preliminary exams, 1.5 hours each, and a written Final exam, 2.5 hours. More information about coverage etc. will be provided before the exams.

Prelim 1: September 17, 7:30-9:00 pm, Rock 203

Prelim 2: October 31, 7:30-9:00 pm, Goldwin Smith Hall G64

Final Exam: Date/location To Be Announced.

Course Grades: Each student will be assigned a letter grade at the conclusion of the course. The grade will be calculated based on component grades:

Final Exam: 25%

Each Prelim (1 and 2): 20%

Homework Solutions: 10%

Homework Quizzes: 20%

Participation in Discussion Section: 5%

Tentative Syllabus:

| Week | Chapter in K&K | Topic |
|------|----------------|--------------------------|
| 1 | 1 | Vectors and Kinematics |
| 2 | 1 | Vectors and Kinematics |
| 3 | 2 | Newton's Laws and Forces |
| 4 | 3 | Newton's Laws and Forces |
| 5 | 4 | Momentum |
| 6 | 4 | Momentum |
| 7 | 5 | Work and Energy |
| 8 | 5 | Work and Energy |
| 9 | 7 | Angular Momentum |
| 10 | 8 | Rigid Body Motion |
| 11 | 11 | Harmonic Oscillator |
| 12 | 12 | Special Relativity |
| 13 | 13 | Special Relativity |
| 14 | 14 | Special Relativity |