Physics 100, Spring, 2003-2004

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This document will be updated online to reflect changes in the course administration and procedures. The latest version can always be obtained from a link on the course web page,
`http://www.pas.rochester.edu/~ksmcf/p100`

1 Lectures

Physics 100 lectures are given Monday and Wednesday at 2:00 - 3:15 pm in B&L 106. Attendance and class participation are strongly encouraged and will have a significant positive impact on your grade.

2 Texts

One text is required: Physics, Concepts and Connections, by Art Hobson

Books of interest have been placed on reserve in the Physics and Astronomy Library, located on the 3^{rd} floor of B&L.

Other material will be available on the course home page.

3 Office Hours

Tuesdays from 10:00 - noon, or by appointment. You are welcome to drop by without notice, and I will speak to you if I am available, but I ask for you to understand if I am otherwise engaged and unable to meet with you.

Much of my research is performed at research facilities not located in Rochester, and consequently I am frequency not in town on Thursdays and Fridays.

4 Course Material/Syllabus

We will not follow Hobson's book closely, but rather will use it as a reference. You will be responsible for material in the assigned readings and the lectures. This course will emphasize the physics of the 20^{th} Century and will not be a general overview or introduction to physics. We will cover:

- What is the Scientific Method and How Does it Work? (3.5 lectures)
  - Early Astronomy: Ptolemy and Copernicus
  - Gravity and Mechanics: Aristotle, Galileo and Einstein
- Mathematical Necessities (1.5 lectures)
  - A **brief** Math Review
  - Estimating and Exponents
  - Probability and Statistical Interpretation of Data
  - Risk Analysis from a Scientific Perspective
- Classical Physics: Physics before 1904 (6 lectures)
  - Classical Mechanics: Projectile Motion, Energy, Momentum
  - Electricity and Magnetism; Light.
- Special and General Relativity (4 lectures)
  - Understanding Einstein
  - Black holes, falling elevators, and the evolution of the universe
- Quantum Mechanics (4 lectures)
  - Particles as Waves
  - Waves as Particles
  - The Uncertainty Principle
- The Modern Theory of Matter (5 lectures)
  - Atoms: protons, neutrons and electrons
  - Nuclei, strong and weak nuclear forces, radioactivity
  - Fission and Fusion
  - Quarks and leptons
  - Particle Physics and the Big Bang: Cosmology
- Special Topic (TBC): The Physics of Terrorism and Counter-Terrorism (4 lectures)
  - Radioactive and Nuclear Weapons Proliferation
  - Detection and Analysis of Terrorist Threats

5 Exams

There will be one midterm exam and one final exam. The midterm will cover the course material through Einstein's relativity and is scheduled for classtime Monday, March 22nd (2:00-3:15 pm in B&L 106). The final exam will be comprehensive and is tentatively scheduled for May 4th at 4:00pm. Makeup exams will, in general, not be given. Anyone who misses an exam without first contacting Prof. McFarland should expect to receive a grade of 0.

6 Homework

Homework sets will be assigned most but not all weeks. Typically they will be assigned on Wednesday and due that following Tuesday at 4pm. The assignments are to be placed in the locker labeled **P100** located outside of room 106. You can pick up your graded homework outside Prof. McFarland's office. Late homework will not be accepted. The homework represents a substantial fraction of your course grade, so please plan ahead and complete the homework by the due date. You are permitted and encouraged to discuss the problems in the homework with other students in the class, and where the homework requests experiments to be done, you may collaborate with other students. However, it is expected the writing and analysis and explanations contained in the the homework turned in by each individual student will represent his or her own work.

7 Papers

In addition, there will be a one page paper due each Friday of the course except as announced in class. For each paper, you will be allowed to select one of several topics. Typically these will relate material outside the course (from the humanities or from outside articles) to material covered in the course. You will be graded on the quality of the analysis, the quality of the examples you chose, and the quality of your written expression and argument. There will be no final paper for this course.

8 Workshops

This course requires participation in a 105 minute "workshop" where you will have the opportunity to tackle new problems and experiments with your fellow students under the guidance of a workshop leader. Attendance and participation is a required part of the course.

Signup for workshops will be web-based. To sign up or view your workshop section, you may go to

`https://spider.pas.rochester.edu/signup/PHY100-S04/`

Sections for workshops will be held

Workshop	*CRN/Time/Place*	
xxxxx	Wed 7:00-8:45pm	B&L 208
xxxxx	Wed 7:00-8:45pm	B&L 108
xxxxx	Thu 3:15-5:00pm	B&L 208
xxxxx	Fri 11:00am-12:45pm	B&L 108
xxxxx	Fri 1:30-3:15pm	B&L 208

9 Grading

Homework	15%
Workshop Participation	10%
Weekly Papers	25%
The midterm exam	20%
Final exam	30%

I reserve the right to change this grading scheme, but I will notify you as soon as possible if such a change takes place.

10 Your Teaching Assistants and Interns

TA/TI	Office	Phone	E-mail
Bob Forties	B&L 466	x5-7374	rf002k@mail.rochester.edu
Ed Nelson	B&L 478	x5-0339	ednelson@pas.rochester.edu