Jon Buchholz

PHYSICS 103
Fall 1995

Prerequisites: Algebra and trigonometry.

Materials Needed:

Text: Serway & Faughn, College Physics, fourth edition.

Physics 103 Lab Manual by Camerini, Fry, Kurtz, and O'Brian.

Lab notebook: preferably hard bound with cross-hatched ruling. Bring to first laboratory meeting (week of 9/11).

Calculator: preferably with trigonometric, exponential, and logarithmic functions. Know how to use it, and make sure batteries are charged for exams.

Lectures: 1:20 or 2:25 pm MWF in 1300 Sterling Hall. Profs. J. C. Sprott (3285 Chamberlin, 263-4449, sprott@juno.physics.wisc.edu) and W. F. Fry (3418 Sterling, 262-5829, wfry@wishep.wisc.edu). The lectures supplement but do not substitute for the reading. Read the assigned material before lecture.

Discussion sections: Your discussion section will be led by your TA who will be your prime contact and source of assistance. General questions about the homework are allowed before it is due, but don't expect your TA to work out the solutions for you in advance.

Laboratory: Follow the instructions in the introduction to the laboratory manual. The experiments are to be written up during the laboratory period in the lab notebook. Have your lab instructor initial and date the work before you leave the lab. The lab notebook is not to be taken from the lab except with permission of your instructor.

Homework: The homework problems are assigned in the syllabus for each week and should be handed in at the beginning of the Monday lecture the following week. Late problem sets will not be accepted. Homework will count toward your grade. Feel free to discuss the homework with others, but make sure the paper you turn in is not simply copied from someone else. The solutions will be discussed in your discussion section and placed on reserve in the Physics Library (4220 Chamberlin).

Hour Exams: Exams will be given at 7:15-8:15 pm on the following Thursday evenings:

October 5, Chapters 1-4
November 2, Chapters 5-8
November 30, Chapters 9-12

The exams will be closed book, but you will be allowed one 8½ x 11 inch sheet of paper on which you may write anything you wish. The

exams will be graded and handed back in your discussion section. Solutions will be discussed and placed on reserve in the Physics Library (4220 Chamberlin).

Final Exam: The final exam will be at 5:05 pm on Tuesday, December 19 (room to be announced). It will cover the entire course (Chapters 1-14) with equal weight. You will be allowed two 8½ x 11 inch sheet of notes.

Grading: The course grade will be made up of the following components:

3 hour exams	300 points
Final exam	200 points
Labs and homework	100 points
TOTAL	600 points

Lab and homework grades will be assigned by your TA and will be normalized to the distribution on the hour exams. Letter grades will be assigned based on the total number of points accumulated.

Consultation Room: Room 2402 Sterling is staffed by TA's from Physics 103 during much of the week. See the schedule card on the door. You may ask questions of any of the TA's or come during the hours that your TA is there. You may also make an appointment with your TA at any mutually convenient time and place.

Alternate References: To see the same topics explained differently, try the following on reserve in the Physics Library (4220 Chamberlin):

Blatt, Principles of Physics, 3rd edition
Cutnell and Johnson, Physics, 3rd edition
Giancoli, Physics, 4th edition
Jones and Childers, Contemporary College Physics, 2nd edition

General Advice: Physics is not something you read and memorize, rather it is something you learn how to do. Try the following study procedure:

1) Read the chapter prior to lecture, so that you will know what it's about.

2) Listen carefully to the lecture and take notes.

3) This is crucial: Do not go back and read and re-read the chapter until you "understand it." Rather, start working problems, going back through the chapter to clarify points as they come up.

PHYSICS 103
FALL 1995
SYLLABUS

References are to Serway & Faughn, College Physics, fourth edition.
Lab manual is Camerini, Fry Kurtz and O'Brian, Physics 103 Lab Manual

Week	Reading	Problems		Lab
9/4	Chap 1	1, 18, 30, 33, 40		no lab
9/11	Chap 2	15, 17, 27, 37, 56		M-1
9/18	Chap 3	2, 11, 22, 28, 44		M-2
9/25	Chap 4	5, 20, 30, 50, 73		M-4
10/2	Chap 5	6, 16, 22, 38, 48	Exam	makeup
10/9	Chap 6	3, 17, 35, 46, 64		M-10
10/16	Chap 7	8, 15, 22, 33, 43		M-5
10/23	Chap 8	4, 10, 15, 17, 21		M-6
10/30	Chap 9	10, 17, 19, 31, 47	Exam	makeup
11/6	Chap 10	6, 11, 23, 33, 45		M-11
11/13	Chap 11	9, 13, 25, 41, 47		M-14
11/20	Chap 12	7, 11, 29, 37, 39		makeup
11/27	Chap 13	3, 9, 15, 19, 39	Exam	makeup
12/4	Chap 14	7, 11, 15, 23, 31		H-1
12/11	review			S-1

12/19 final exam Thursday, 5:05 pm, Chapters 1-14 (room to be announced)

Name_____ Section_____

Physics 103

Exam #2

Time limit: 60 minutes
Closed book

November 2, 1995
7:15-8:15 pm

Score: Problem #1 (25 points) _____

Problem #2 (25 points) _____

Problem #3 (25 points) _____

Problem #4 (25 points) _____

TOTAL (100 points) _____

For full credit you must show your work.

You are allowed to use one 8½ X 11" sheet of notes during the exam.

1. A 1400-kg automobile is traveling 80 km/h along a road that goes up a hill at a 10° angle.

(a) Ignoring friction, how much power must the automobile engine produce?

(b) If the engine suddenly stops, how far along the road will the automobile coast before coming to rest?

2. An automobile of mass of M_1 = 1000 kg traveling north at v_1 = 30 m/s collides with a truck of mass M_2 = 2000 kg traveling east at v_2 = 20 m/s, and the two vehicles lock together.

(a) Calculate their speed just after the collision.

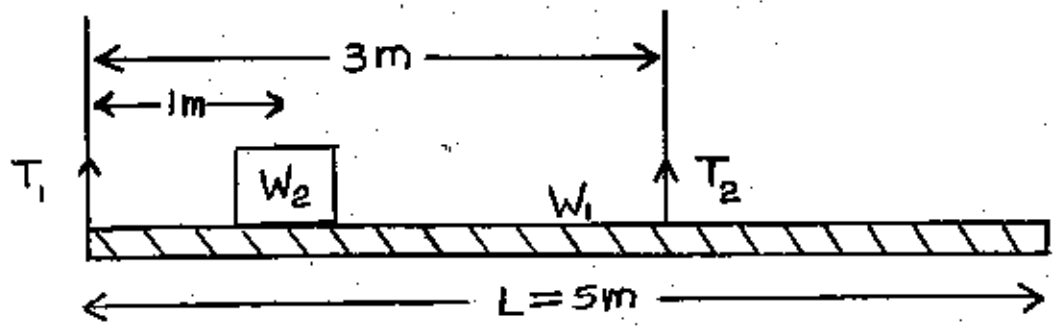
(b) Calculate the amount of mechanical energy lost in the collision.

3. A geosynchronous satellite orbits the earth ($r_E = 6.38 \times 10^6$ m, $M_E = 5.98 \times 10^{24}$ kg) every 24 hours in a circular orbit above the equator so as to remain at a fixed position in the sky.

(a) Calculate the height of the satellite above the surface of the earth.

(b) Calculate the speed of the satellite.

4. A uniform beam of weight W_1 = 500 N and length L = 5 m is supported by two ropes as shown below. A weight of W_2 = 1000 N is located 1 m from the left end of the beam.



(a) Calculate the tension T_1 in the rope on the left.

(b) If the ropes can withstand a maximum tension of 1000 N, how far to the right can one move the weight without breaking a rope?