PHYSICS 1020: FUNDAMENTALS OF PHYSICS **SPRING 1997**

Text: ***PHYSICS, Concepts and Connections***, by Art Hobson, published by Prentice Hall, 1995

Lecturer:	Horst D. Wahl	Office: 512 Keen	Phone: 644-3509
Office Hours:	Mon 09:00 - 10:00	Wed 09:00 - 10:00	Email: wahl@hep.fsu.edu
	or by appointment,	or any time you catch me	
discussion sessions:	Mon 14:00 - 16:00	Thu 17:00 - 19:00	KEN 503

This course is intended to provide a general knowledge of the basic concepts, facts and methods of physical science. It is designed to help you acquire "scientific literacy" enabling you to appreciate news relating to science, and to make reasoned judgments about societal issues relating to or influenced by science. Although mathematical tools play an important role in science and particularly in physics, this course aims to deemphasize its use, concentrating on conveying the concepts rather than details. Even so, the use of simple mathematics cannot be completely avoided without sacrificing knowledge of one of the important characteristics of physics, namely its quantitativeness.

Class Meetings

Class meets Monday and Wednesday 12:30 to 13:45 (1:45 pm) in UPL 101. Class periods are used for lectures, to show experimental demonstrations, and to administer exams. The lectures will emphasize the most important subjects and present additional material beyond the textbook; they complement the book, but do not replace reading the book. In fact, you are expected to have read the material indicated in the syllabus before coming to class.

Use of computer and World Wide Web

The use of computers as a tool of communication and to access information is becoming more and more important, and familiarity with these aspects of computer use will be expected from you in your future career. Students in this course are required to get a computer account in the FSU academic computing system, and sign up for the class mailing list. I will use both the World Wide Web and electronic mail to communicate with you. Lecture notes, homework solutions, study lists for exams and exam solutions will be posted on the World Wide Web. The course homepage is `http://www.hep.fsu.edu/~phy1020/spr97/index.html`.

Completion and Grading of the Course

A student will have completed the course and will be *eligible* for a passing grade *only* if he/she

- attempts three of the four scheduled in-class-exams given during the semester;
- attempts the final exam on Tuesday April 22 from 12:30 to 14:30 (12:30 to 2:30pm);
- gets the minimum number of points for a passing grade (see later).

The course grade will be calculated using the grades from the in-class-exams (representing 70% of the total), and the final exam (representing 30% of the total). The following table contains the approximate minimum number of points (for 100 points maximum) necessary to achieve a given letter grade:

grade	points
A	90
B	75
C	55
D	40

Homework Problems

Understanding of scientific concepts cannot be achieved by the purely passive process of listening to a lecture, being entertained by demonstrations, or reading a book and memorizing its contents. Active involvement on the side of the student is needed, namely the process of thinking through the concept and its consequences for particular situations. One of the most efficient ways of doing this consists in doing the homework problems listed (and any extra related ones that you find interesting) for each week in the syllabus. Incidentally, this is also the best way to prepare for the in-class-exams and the final exam. Homework problems will not be turned in and graded. Solutions will be posted on the World Wide Web, and two copies will also be available in the Dirac Science Library. You can ask questions about homework problems in class, during office hours, by e-mail, and during the discussion sessions.

Mini-exams and pop quizzes

- Four in-class-exams are scheduled during the semester; note their dates and make sure not to miss them, since no make-up exams will be given. Exams missed without valid (and documented) reason will count as "0". If you anticipate having to miss an exam for a valid reason, let me know *beforehand.*
- The material covered in a mini-exam will be that presented in class in the lectures preceding the lecture in which the mini-exam is given.
- Each student is responsible for bringing a 2B pencil and a working calculator to each exam. Most problems can be done without a calculator.
- In addition to the scheduled exams, there will also be a number of pop-quizzes by which you may earn extra points.

Final Exam

The final exam will be given on Tuesday 22 April from 12:30 to 14:30, at a location to be announced in class later in the semester.

Resources for Students

Several resources are available to you to help you learn a lot of physics and end up with a good grade:

- Classes: The lectures complement your reading assignment. Certain materials for which you will be responsible at exam time will be presented in class but are not covered in the book.
- Professor's office hours: There are scheduled office hours to help students with homework problems and other matters that arise during the course. Other times can be arranged by appointment. You are strongly encouraged to come see me if you have difficulties — don't be afraid, I bark but I don't bite.
- Discussion sessions: Two discussion sessions are scheduled during which you can ask any question you like to ask, or just listen to the questions asked by others (and my answers to them).
- Physics Department consultation sessions. During the time slots given in the table below, a graduate student is available to answer questions, help with homework problems, and supply other needed assistance (e.g. cheer you up).

Physics Department Consultation Roster

day	from	to	place	tutor
Monday	1:25	2:25 pm	105 UPL	Lewis Riley
Tuesday	5:45	6:45 pm	105 UPL	Tony Delia
Wednesday	2:00	3:00 pm	112 UPL	Margie Abdelrazek
Wednesday	5:45	6:45 pm	105 UPL	Tony Delia
Thursday	1:25	2:25 pm	105 UPL	Lewis Riley

Some Advice

- Acquiring and consolidating knowledge of physics and physical science requires understanding rather than pure memorizing. I will do my best to help, but you, the student, have to be prepared to fulfill your part of the bargain; the teaching goal will not achieved without you being actively involved in the learning process: you have to study and digest the material. Nobody can do that for you.
- The pieces of knowledge and understanding that you are expected to acquire in this course are not independent: lectures and chapters in the book build on each other – you have to understand previously presented material in order to be able to follow new things. Therefore it is very important to stay up-to-date. You will not succeed if you start studying the night before the exam.
- Your performance in the in-class-exams represents a large contribution to your final grade. To be prepared for these exams, you have to make an effort to stay up to date and make sure you understand and can do all the homework problems. If you can talk yourself into it, do any extra problems you feel may help you.
- In an exam always ask yourself "Is this answer sensible?" Do not hand in too early. If you are done early, use the time to check your solution.
- Attend all lectures.
- Use the book, you paid a lot of money for it! You should have read the relevant chapter of the book before it is covered in class.
- Use the resources offered (office hours, discussion sessions, e-mail, World Wide Web, consultation sessions).
- If you have an opportunity to study with colleagues, by all means do so.

Homework assignments

chapter	homework
1	H: 2; E: 4,6,8,12,24
2	H: 1; E: 2,4,6,8,14,21,22,25
3	H: 2,6; E: 4,12,13,19,20,30
4	H: 2; E: 6,7,11,12,13,14,22,23,26
5	E: 2,3,13,16,19,20,27
6	H: 3; E: 3,5,7,10,15,16,27,28
7	H: 1,5; E: 6,7,10,19,21,23,24
8	H: 2; E: 5,8,12,18,26,27
9	H: 2,3; E: 4,12,14,18,22,30
10	E: 4,5,6,15,16,17,26
11	H; E: 1,2,5,7,12,16,18,20
13	H: 1,2; ; E: 2,5,6,9,12,14,16,20,25
14	H: 1,2; E: 4,5,7,8,12,13,15,16,18,23
15	H: 1,2; E: 1,2,3,7,12,15,18
16	E: 2,3,5,6,8,12,14
17	H: 1,2; E: 5,6,9,12
18	E: 1,2,5,6,7,9,10,11,12,14

In this list, "H" refers to items under the heading "home projects", and "E" to "exercises". In addition to this, you are strongly encouraged to go through the "dialogues" and the "review questions".

PHYSICS 1020 SYLLABUS SPRING 1997

Date	L#	Lecture subject	reading ass.	exam
Mo 01/06	1	introduction, about science, we and the universe	1	
We 01/08	2	measurement and units, scientific notation		
		atoms, properties of matter	2	
Mo 01/13	3	coordinates, position, displacement, vectors,		
		motion, velocity, acceleration		
We 01/15	4	Aristotle vs Galilei, law of inertia	3	1
Mo 01/20	-	Martin Luther King Day – no classes		
We 01/22	5	forces, weight, Newton's laws of motion		
		momentum, angular momentum, conservation laws	4	
Mo 01/27	6	Kepler's laws, Newton's law of gravitation		
		Newtonian worldview and beyond	5	
We 01/29	7	work, energy, power, types of energy	6	
Mo 02/03	8	interchangeability and conservation of energy		2
We 02/05	9	heat, heat engines, 2nd law of thermodynamics, entropy	7	
Mo 02/10	10	waves	8	
We 02/12	11	electromagnetism	9	
Mo 02/17	12	electromagnetic radiation		
We 02/19	13	Galilean relativity, problems with Newtonian mechanics,	10	
		principle of special relativity		
Mo 02/24	14	special relativity: consequences	11	
We 02/26	15	general relativity, geometry of the universe		
Mo 03/03	16	the path to quantum theory: atomic spectra,	13	3
		black body radiation, photoelectric effect		
We 03/05	17	quantum mechanics: waves vs particles, probabilities		
Mo 03/10	-	Spring Break – no classes	-	
We 03/12	-	Spring Break – no classes	-	
Mo 03/17	18	matter and radiation, atomic spectra,	14	
		uncertainty principle		
We 03/19	19	chemical bonds, states of matter, phase transitions		
		properties of materials		
Mo 03/24	20	nuclei, radioactivity	15	
We 03/26	21	nuclear reactions, fission, fusion	16	
Mo 03/31	22	nuclear power, detectors for particles and nuclei	17	4
We 04/02	23	particle physics, quantum fields	18	
		quantum electrodynamics, antimatter		
Mo 04/07	24	particle physics: structure of matter, quarks		
We 04/09	25	particle physics: unification,		
		gravity, cosmology		
Mo 04/14	26	semiconductors, transistors, electronics, computers		
We 04/16	27	reserve/review		

FINAL EXAM: Tuesday Apr. 22 from 12:30 to 14:30 (12:30pm to 2:30pm) in SCN 214
**** GOOD LUCK! *****