Science 1 Physics

WEB SITE:	http://musr.physics.ubc.ca/~jess/sci1/
CLASSROOM:	Klinck 460
TIMES:	Variable.
INSTRUCTOR(S):	Jess H. Brewer (JHB) *and* Domingo J. Louis-Martinez (DJLM)
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OFFICE:	JHB: Henn 320A, 822-6455; DJLM: Klinck 464, 822-0911
LABORATORY:	JHB: TRIUMF, 222-1047
OFFICE HOURS:	Available any time, within reason.

MARKING: According to the *"Essentials 101"* handout from Week 1, 70% of the overall *Science 1* marks are allocated for exams and assignments, to be divided equally between the four disciplines. Here is how the "Physics share" of this part will be reckoned:

Quizzes and in-class activities	9/4
Midterms (two)	each 8/4
Christmas Exam	15/4
Final Exam	30/4
total Physics share (excluding Labs)	70/4

Individual quizzes *etc.* will be marked "semi-pass/fail" [see next page].

TEXTBOOK: Paul A. Tipler, "Physics" (Worth)

REFERENCES:

- *Science 1 HyperTextBook*: http://musr.physics.ubc.ca/~htb/
- *The Skeptic's Guide to Physics*: http://musr.physics.ubc.ca/~jess/hr/skept/
- *Science 1 WebCT site*: See WEB SITE (top of page) for link.
- Various and assorted Handouts
- Halliday, Resnick & Walker, "Fundamentals of Physics" (Wiley)

ASSIGNMENTS: Problem sets are handed out at a Physics lecture and posted on the *Science 1 Physics* Web site almost every week. Solutions are posted on the Web site a week later. Although the assignments are not all marked for credit, they are an essential part of the learning process. Each student should first attempt each problem independently before consulting colleagues or instructors; but help is always available and collaborative use of the *WebCT Bulletin Board* is encouraged.

At the end of each Physics lecture, reading or other home study will be assigned. At the next Physics lecture I will expect you to have studied this material; a large part of that lecture will be reserved for discussion of the material . . . or . . .

QUIZZES: . . . if there are no questions on the day's home study material, I will almost always come equipped with a *quiz* to give you a chance to show how well you have mastered it. These quizzes and other in-class activities will be marked on a "semi-pass/fail" basis: you will receive half credit for making some attempt and turning it in; full credit for demonstrating that you were prepared for class. Other in-class exercises will be treated the same way; they are meant mainly as learning opportunities rather than for evaluation.

READING: We do not follow the texbook slavishly, though it is a very good one. Reading assignments "jump around" in the text and regularly include supplementary handouts, Web links (particularly the *Science 1 HyperTextBook*, which see) or journal references. You may often wish to explore interesting topics further; we will be glad to suggest sources.

HYPERTEXTBOOK: In Summer 1999 we constructed an "alpha" version of the *Science 1 HyperTextBook*, an interactive database of "learning quanta" which we hope will eventually serve as a model for interdisciplinary education using the Web. It was upgraded and extended in Spring 2000 and is still (perpetually) under development. All *Science 1* students are guaranteed access to the Web and are expected to become *co-authors* of the *HyperTextBook*. (You'll see how when you try it out.)

WEB SITES: We make liberal use of the Internet in *Science 1*, both for "external" reference material and for "internal" logistics and communication. Paper copies of Physics reading assignments from the Web will be provided *on demand*; but we are trying to reduce tree consumption, so please have a look at the electronic version before you decide whether you really need a hard copy.

We have several Web sites of our own where you can peruse other course material such as problem sets, solutions, old exams *etc.* You should be now be aware of the on-line *Science 1 People database* at http://142.103.117.44//~jess/sci1/peo/ where you can keep your profile up to date. We will be using similar Web tools to conduct on-line surveys to keep track of your preferences and evaluations of the course.

On the *WebCT* site you will be able to post messages and carry on discussions in various Fora on the Bulletin Board (an approved method for collaboration on Physics problem sets), try your hand at "electronic tutorials" and quizzes (when available) or work on Web-based projects, either individually or in groups. You can also send "internal" E-mail to other *Science 1* students or faculty, but from within *WebCT* it cannot be sent to "outside" E-mail addresses; for that, use the *Science 1 People database* [see above] or one of the *Science 1* listservers (*e.g.* sci1-all@grunthos.sci1.ubc.ca).

SCIENCE 1 PHYSICS: How does *Science 1* Physics differ from other first year Physics courses? One difference is that we try to accelerate the development of your intellectual maturity — your recognition of the fact that "teach" is an intransitive verb and that *learning* is something **you** have to do. This may sound obvious, but it is a rare first year student who has had much experience with taking responsibility for learning. We will help in any way we can, of course, but you may find our "teaching style" unfamiliar at first. Stick with it. You'll be glad you did!

Another difference is obvious and somewhat trivial, but nonetheless profoundly important: since the teaching staff of *Science 1* attend each other's lectures, we all know what is going on in the other subjects, whereas professors teaching "normal" Physics courses usually have no idea what is happening in their students' Mathematics, Chemistry or Biology courses. It is human nature to notice connections between topics in different fields and to want to discuss them — we all want to "re-use our paradigms" as much as we can, in the name of efficiency (constructive laziness). The *Science 1* environment allows this natural tendency to express itself creatively.

NATURAL PHILOSOPHY: I am here to help you learn Physics, the discipline, not "about" Physics. On the other hand, until quite recently Physics was known officially as Natural Philosophy; moreover, modern Physics has drastically altered the ways we perceive the world we live in. It would be tragic to learn how to predict the behaviour of (some parts of) that world without stopping to reflect on the philosophical implications of our new knowledge. A *knowledge* of Physics is valuable for its predictive power — the tools of Physics allow us to build wonderful devices, to manipulate matter profitably and to move wisely through our physical environment. An *understanding* of Physics requires integration of new paradigms and metaphors into one's intellectual repertoire — your mind will be permanently altered by this experience.

THE FIRST-YEAR SYNDROME: Any first year Physics course must necessarily be devoted largely to building up a "Physics vocabulary" of terms and concepts that are generally labelled as "classical" Physics, so that later courses can utilise that vocabulary to describe the unsettling conceptual revisions of the Twentieth Century — some of which render obsolete the very terminology in which we attempt to describe them. This tends to make the first year relatively dull; many physicists, looking back, feel that their first year course was the low point of their Physics education. We do everything in our power to counteract this functional dilemma, but if it occasionally gets a little tedious, please remember this: there can be no magic without some apprenticeship.