

COURSE TITLE:

*Electromagnetic Theory*

CALENDAR ENTRY:

**Physics 401.** (3) *Electromagnetic Theory* — The application of Maxwell's theory to the propagation of electromagnetic waves. *Prerequisite:* PHYS 301. [0-0-0; 3-0-0]

TIME AND PLACE: Lectures: Hebb 12 - Mon, Wed & Fri 09:00-09:50. Tutorials: Mon 12:00-12:50 (location TBA)

WEB SITE: <http://musr.physics.ubc.ca/~jess/p401/>

INSTRUCTOR: Jess H. Brewer

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OFFICE: Hennings 320A: 822-6455

LABORATORY: TRIUMF: 222-1047, ext 6471

OFFICE HOURS: After class or by special appointment,  
until an optimum alternative is found.

MARKING:

ITEM	MARKS
Assignments	20
Midterm Exam	30
Seminar & Writeup	10
Final Exam	40
TOTAL	100

TEXTBOOK: David J. Griffiths, "Introduction to Electrodynamics", 3<sup>rd</sup> Ed. (Prentice Hall 1999). ISBN: 0-13-805326-X

REFERENCES:

- E.M. Purcell, "Electricity and Magnetism" (slightly lower level than Griffiths, very nicely done).
- Feynman, Leighton & Sands, "The Feynman Lectures on Physics", Vol. 2 (great book - a universal favourite of grad students studying for orals).
- Corson & Lorraine, "Electromagnetic Fields and Waves" (level similar to Griffiths but more "nuts & bolts").
- Jerry B. Marion, "Classical Electromagnetic Radiation" (level similar to Griffiths but emphasizing mathematical elegance).
- J.D. Jackson, "Classical Electrodynamics" (if you want something to sink your teeth into - graduate E&M - this is just a tad above our level).
- L.D. Landau & E.M. Lifshitz, "Electrodynamics of Continuous Media" (if you want to do it right the first time).
- Arfken, "Mathematical Methods for Physicists" (great reference for mathematics, vector calculus, differential equations, tensors, special functions, coordinate systems, complex variable theory, Fourier analysis and a wide variety of applications in all fields of physics, including E&M).

**ASSIGNMENTS** will be handed out at a lecture (usually on Wed.) each week and handed in at the beginning of the lecture 1 week later unless otherwise specified; solutions will be provided at that time. *The deadline will be strictly enforced and late assignments will not be marked.* There will be approximately 12 assignments. The assignment mark will be based on the average of the *best 8* assignment marks for each student.

**COLLABORATION:** You are encouraged to seek help from each other in doing the homework; discussing the problems in a study group is a great way to learn, but I expect each student to write up (and understand!) his/her own solutions handed in for grading. This is taken very seriously — students have been thrown out of school for copying! (I apologize if I am insulting your intelligence by stating the obvious, but this probably won't be the last time. ;-)

**SEMINARS:** Each student will investigate a topic of his/her choice (subject to my approval) and share it with the class in a short *seminar*. Your presentation will be accompanied by a short (3-6 page) *written report* summarizing the same material. (This is the usual procedure at conferences, so it will be good practice.) Half the assigned marks will be for the presentation and half for the writeup. The oral report will be an 8-minute seminar-style presentation in class, followed by 3-5 minutes of discussion and questions. (This is typical of the time allocated for contributed talks at conferences.) All students present for the seminar will participate in its evaluation. The final exam will probably include several "quickie" questions on selected seminars.

In keeping with the "Conference" model, I would like to present each of you with a hard copy of the "*Physics 401 Seminar Proceedings*": a collection of all your essays, or rather all those which you give me permission (in writing) to include. (Written permission is necessary because otherwise I would be violating your copyrights.) Although I am always tempted to suggest "publication" on the Web, this does invite others to "borrow" your ideas. If there is any interest, I can set up a *wiki* for this purpose. Participation in such a "collaborative publication" would of course be strictly voluntary.

Janis McKenna (who taught PHYS 401 last year) provided a list of suggested topics (see the Web site) in case you need a little help getting started.

**MIDTERMS:** There will be *two Midterms*. The higher of the two marks will be used in calculating your final mark. It is wise to do your best on both.

**MISSED EXAMS:** University policies define clearly what constitute valid excuses for missing exams. Some of these involve giving advance notice to the instructor; others require confirmation in writing by third parties. You should familiarize yourself with these rules. I have several of my own: first, I *do* accept participation in varsity athletic events as a valid reason to miss an exam, but I expect *advance notice in writing* specifying all the details. Second, I *do not* offer written make-up midterms. If you miss a midterm exam for a valid reason, you have the choice of simply omitting it (using the other midterm mark to compute your average) or taking an *oral exam* instead. (In an oral exam I ask you questions and listen to your answers for about an hour; by that time I usually have a good idea of how well you understand the subject.) If you are so unfortunate as to miss *both* midterms for officially valid reasons, I will calculate your final mark out of 70 (without the midterm) and multiply the result by 100/70. However, if you miss a midterm by (for instance) sleeping late or getting stuck in traffic, only an oral exam will prevent a zero mark on that exam. *Plan ahead.*

**FEEDBACK:** You have to do all the work of learning, but there may be things I can do to make it more fun, more efficient, more rewarding or more useful. Let me know if you have any suggestions! There are several *surveys* on our Web site to facilitate such feedback. See

<http://musr.physics.ubc.ca/~jess/surveys/>

We are working on methods to make anonymous feedback possible without also allowing "ballot-stacking" (submitting the same responses more than once). This is a tricky proposition; probably the best we can do will be to make the personal identity of respondents known only to a third-party database to which the surveyor is denied access. Any suggestions?