

P331 Theory of Electricity and Magnetism I (updated 1/14/15)

Indiana University Northwest

Spring 2015

Main Text: *Introduction to Electrodynamics 4th Ed.*, by David Griffiths

Optional/Supplementary Texts: *Div, Grad, Curl, and All That*, by H. M. Schey (course reserve, Main Library); *A Student's Guide to Vectors and Tensors* by D. Fleisch (online through IUCAT, link on Oncourse), *A Student's Guide to Maxwell's Equations* by D. Fleisch

Prerequisites: M311 or M313, P202 or P222

Goal: To understand electromagnetism in its full relativistic form. And to have some fun!

Grades: There will be regular homework (lowest score is dropped), three midterm exams (no make-up exams, the lowest score is dropped), one final exam (cumulative, no make-up), and extra credit. Grades will be posted on Oncourse (oncourse.iu.edu/portal, course 33989). The class will be graded on a curve. The percentages of the total grade from the various components are as follows:

Homework: 25%

Best Midterm: 25%

2nd Best Midterm: 25%

Final: 25%

Extra Credit: 3%

Homework: Homework will be assigned in class or posted on Oncourse. There is a 10% deduction on late homework. There will be written extra credit exercises assigned in class and possibly some in-class extra credit activities.

Exams: Exams will be based primarily on the homework, practice problems, and practice exams. Exams may also contain (mostly conceptual) material from lecture not specifically addressed in the homework, practice problems, or practice exams.

Readings: Read the relevant sections of the textbook and online notes as you would a newspaper before coming to class (see tentative schedule, next page). Reread the textbook and online notes after class, focusing closer on the things that were covered in class, and cross-referencing with your personal hand-written class notes.

Notes: Write down everything that is written on the board. Colored pencils are recommended for note taking as pictures, diagrams, and equations are often written with colored chalk. The recommended minimum set of colors is: red, orange, green, blue, violet, and your favorite sixth color to substitute for yellow.

Math Lab: Walk in tutoring for math, including calculus: 436 HH, (219) 980-6979.

Disability Policy: If you need assistance with a learning, physical, or psychological disability that may affect your academic progress, please contact the Disability Services Coordinator at 219-980-6942, HH 237.

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| Week | Tuesday: Topic | Thursday: Topic |
|-----------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1 | Jan. 13: Ch 12.3.3, 12.3.4: Unpacking Maxwell's Equations | Jan. 15: Ch 12.3.5: Relativistic Potentials; Ch 1.3: Integral Calculus, Integrating ME's |
| 2 | Jan. 20: Ch 12: Special Relativity | Jan. 22: Ch 12: Special Relativity and Electrodynamics |
| 3 | Jan. 27: Ch 1: Vectors | Jan. 29: Ch 1: Vectors |
| 4 | Feb. 3: Review 1, TAKE HOME MIDTERM 1 HANDED OUT | Feb. 5: NO CLASS |
| 5 | Feb. 10: Ch 2: Electrostatics, TAKE HOME MIDTERM 1 DUE AT 6:00 PM | Feb. 12: Ch 2: Electrostatics |
| 6 | Feb. 17: Ch 2: Electrostatics | Feb. 19: Ch 3: Potentials |
| 7 | Feb. 24: Ch 3: Potentials | Feb. 26: Ch 5: Magnetostatics |
| 8 | Mar. 3: Ch 5: Magnetostatics | Mar. 5: Ch 5: Magnetostatics |
| 9 | Mar. 10: Review 2 | Mar. 12: MIDTERM EXAM 2 |
| Mar. 16 – 22: SPRING BREAK!!!!!!!!!!!! | | |
| 10 | Mar. 24: Ch 7: Electrodynamics | Mar. 26: Ch 7: Electrodynamics |
| 11 | Mar. 31: Ch 7: Electrodynamics | Apr. 2: Ch 8: Conservation Laws |
| 12 | Apr. 7: Ch 8: Electromagnetic Waves | Apr. 9: Ch 10: Potentials and Fields |
| 13 | Apr. 14: Ch 11: Radiation | Apr. 16: Ch 12: Electrodynamics and Relativity |
| 14 | Apr. 21: Review 3 | Apr. 23: MIDTERM EXAM 3 |
| 15 | Apr. 28: Review for Final | Apr. 30: Review for Final |
| FINALS | | May 7: FINAL EXAM, Cumulative |

Attendance: Attendance is required. If you do not attend, you may be withdrawn from the course. This course has been approved to enforce the IU Northwest Attendance and Course Commitment Policy and the full text of this policy is available at: <http://www.iun.edu/registrar/attendance-policies.htm>. Students who do not actively participate may be administratively withdrawn from the course, which may have an impact on financial aid awards and/or student visa status. I define active participation as attending lecture, discussion, and labs and completing the homework, labs, and exams at least 50% of the time.