

CLASSICAL ELECTRODYNAMICS II

Physics 65204

FALL 2014

INSTRUCTOR:

Dr. Mark Manley manley@kent.edu
213 Smith Hall <http://www.kent.edu/CAS/Physics/people/manley.cfm>
330-672-2407

CLASS HOURS: 1:10 - 2:00 M W F, 107 Henderson Hall

OFFICE HOURS: 3:30 - 4:30 M W
 3:00 - 4:00 T
 11:00 - 12:00 R
 (or by appointment)

TEXT: *Classical Electrodynamics*, third edition, by John David Jackson (Wiley).

PREREQUISITE: Classical Electrodynamics I (PHY 65203). Students who do have the proper prerequisites risk being deregistered from the class.

STUDENT LEARNING OUTCOMES: Upon successful completion of this course, students will be able to:

- Apply Maxwell's equations to a variety of problems involving time-dependent phenomena.
- Solve problems involving the propagation and scattering of electromagnetic waves in a variety of media.
- Demonstrate an understanding of the characteristics of electromagnetic radiation.
- Have a good understanding of Special Relativity, especially as applied to electrodynamics.

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| GRADE DETERMINATION: | Homework | 20% |
| | Exam 1 | 25% |
| | Exam 2 | 25% |
| | Final Exam | 30% |

HOMEWORK: Problems will be assigned in class. Homework assignments *must* be handed in on time.

EXAMS: Each of the two midterm exams will cover only those chapters of the text that were covered in class since the previous exam. The final exam will be comprehensive.

COVERAGE: As indicated on the tentative course outline.

MAKEUP CLASSES: I anticipate being away occasionally because of research commitments. Make-up classes will be scheduled as needed.

CHEATING AND PLAGIARISM:

University policy 3342-3-01.8 deals with the problem of academic dishonesty, cheating, and plagiarism. None of these will be tolerated in this class. The sanctions provided in this policy will be used to deal with any violations. If you have any questions, please read the policy at http://www.kent.edu/policyreg/-policydetails.cfm?customel_datapageid_1976529=2037779 and/or ask.

STUDENTS WITH DISABILITIES:

University policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure their equal access to course content. If you have a documented disability and require accommodations, please contact the instructor at the beginning of the semester to make arrangements for necessary classroom adjustments. Please note, you must first verify your eligibility for these through Student Accessibility Services (contact 330-672-3391 or visit www.kent.edu/sas for more information on registration procedures).

REGISTRATION REQUIREMENT:

The official registration deadline for this course is September 7, 2014.

University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashFast) prior to the deadline indicated. Registration errors must be corrected prior to the deadline.

The course withdrawal deadline is November 2, 2014.

TENTATIVE COURSE OUTLINE:

| Week | Date | Day | Tentative Schedule |
|------|--------|-----|---|
| 1 | Aug 25 | M | Ch. 6—Maxwell Equations |
| | Aug 27 | W | Ch. 6—Gauge Invariance of Electromagnetism |
| | Aug 29 | F | Ch. 6—Green Functions for the Wave Equation |
| 2 | Sep 1 | M | Labor Day—No Classes |
| | Sep 3 | W | Ch. 6—Poynting's Theorem |
| | Sep 5 | F | Ch. 6—Continued |
| 3 | Sep 8 | M | Ch. 7—Plane Waves in a Nonconducting Medium |
| | Sep 10 | W | Ch. 7—Continued |
| | Sep 12 | F | Ch. 7—Linear and Circular Polarization |
| 4 | Sep 15 | M | Ch. 7—Reflection and Refraction of Waves |
| | Sep 17 | W | Ch. 7—Dispersive Effects |
| | Sep 19 | F | Ch. 7—Kramers-Kronig Relations |
| 5 | Sep 22 | M | Exam 1 |
| | Sep 24 | W | Ch. 7—Continued |
| | Sep 26 | F | Ch. 9—Fields and Radiation |
| 6 | Sep 29 | M | Ch. 9—Continued |
| | Oct 1 | W | Ch. 9—Continued |
| | Oct 3 | F | Ch. 9—Continued |
| 7 | Oct 6 | M | Ch. 10—Scattering of Electromagnetic Waves |
| | Oct 8 | W | Ch. 10—Continued |
| | Oct 10 | F | Ch. 10—Continued |
| 8 | Oct 13 | M | Ch. 10—Continued |
| | Oct 15 | W | Ch. 11—Special Theory of Relativity |
| | Oct 17 | F | Ch. 11—Lorentz Transformations |

TENTATIVE COURSE OUTLINE (Continued):

| Week | Date | Day | Tentative Schedule |
|------|--------|-----|---|
| 9 | Oct 20 | M | Ch. 11–Continued |
| | Oct 22 | W | Ch. 11–Covariance of Electrodynamics |
| | Oct 24 | F | Ch. 11–Continued |
| 10 | Oct 27 | M | Ch. 11–Continued |
| | Oct 29 | W | Ch. 11–Continued |
| | Oct 31 | F | Exam 2 |
| 11 | Nov 3 | M | Ch. 14–Liénard-Wiechert Potentials for a Point Charge |
| | Nov 5 | W | Ch. 14–Power Radiated by an Accelerated Charge |
| | Nov 7 | F | Ch. 14–Continued |
| 12 | Nov 10 | M | Ch. 14–Continued |
| | Nov 12 | W | Ch. 14–Continued |
| | Nov 14 | F | Ch. 15–Bremsstrahlung |
| 13 | Nov 17 | M | Ch. 15–Continued |
| | Nov 19 | W | Ch. 15–Continued |
| | Nov 21 | F | Ch. 15–Continued |
| 14 | Nov 24 | M | Ch. 15–Continued |
| | Nov 26 | W | Thanksgiving Recess–No Classes |
| | Nov 28 | F | Thanksgiving Recess–No Classes |
| 15 | Dec 1 | M | Catch-up Day |
| | Dec 3 | W | Catch-up Day |
| | Dec 5 | F | Catch-up Day |
| | Dec 12 | F | Final Exam (10:15 a.m. – 12:30 p.m.) |