CLASSICAL ELECTRODYNAMICS I

Physics 6/75203

SPRING 2015

INSTRUCTOR:

Dr. Mark Manley
220 Smith Hall
330-672-2407

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CLASS HOURS: 1:10 - 2:00 M W F, 108 Henderson Hall

OFFICE HOURS: 3:30 - 4:30 M W
3:00 - 4:00 T
11:10 - 12:00 R
(or by appointment)

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

PREREQUISITE: Special Approval. 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:

- Solve boundary-value problems in electrostatics in a variety of coordinate systems.
- Demonstrate a basic understanding of Green Functions and their applications
- Solve problems using special functions, such as Bessel functions and Legendre polynomials.
- Have a basic understanding of magneto-statics.

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 January 25, 2015. The course withdrawal deadline is March 22, 2015. 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.

TENTATIVE COURSE OUTLINE:

Week	Date	Day	Tentative Schedule
1	Jan 12	M	Ch. 1—Coulomb's Law, Gauss' Law, the Electric Field
	Jan 14	W	Ch. 1—Divergence Theorem and Stoke's Theorem
	Jan 16	F	Ch. 1—Poisson and Laplace Equations; Green's Theorem
2	Jan 19	M	MLK Jr. Day—No Class
	Jan 21	W	Ch. 1—Continued
	Jan 23	F	Ch. 1—Continued
3	Jan 26	M	Ch. 1—Potential Energy, Energy Density, Capacitance
	Jan 28	W	Ch. 2—Boundary-Value Prob.; Method of Images
	Jan 30	F	Ch. 2—Orthogonal Functions and Fourier Expansions
4	Feb 2	M	Ch. 2—Separation of Variables
	Feb 4	W	Ch. 3—Laplace's Eq. in Spher. Coord.; Legendre Poly.
	Feb 6	F	Ch. 3—Boundary-Value Prob. with Azimuthal Symmetry

TENTATIVE COURSE OUTLINE (Continued):

Week	Date	Day	Tentative Schedule
5	Feb 9	M	Ch. 3—Spherical Harmonics and Assoc. Legendre Func.
	Feb 11	W	Ch. 3—Laplace's Eq. in Cyl. Coord.; Bessel Func.
	Feb 13	F	Ch. 3—Green Function Expansions
6	Feb 16	M	Ch. 4—Multipole Expansions
	Feb 18	W	Ch. 4—Electric Polarization and Displacement
	Feb 20	F	Ch. 4—Boundary-Value Problems with Dielectrics
7	Feb 23	M	Ch. 4—Molecular Polarizability; Elect. Susceptibility
	Feb 25	W	Ch. 4—Continued
	Feb 27	F	Exam 1 (Chapters 1 and 2)
8	Mar 2	M	Ch. 5—Magnetostatics; Biot and Savart Law
	Mar 4	W	Ch. 5—Continued
	Mar 6	F	Ch. 5—Continued
9	Mar 9	M	Ch. 5—Gauss' Law for Magnetism and Ampère's Law
	Mar 11	W	Ch. 5—The Vector Potential
	Mar 13	F	Ch. 5—Current Distributions; Magnetic Moments
10	Mar 16	M	Ch. 5—Continued
	Mar 18	W	Ch. 5—Magnetic Field; Boundary-Value Problems
	Mar 20	F	Ch. 6—Faraday's Law of Induction
11	Mar 23	M	Spring Break—No Class
	Mar 25	W	Spring Break—No Class
	Mar 27	F	Spring Break—No Class

TENTATIVE COURSE OUTLINE (Continued):

Week	Date	Day	Tentative Schedule
12	Mar 30	M	Ch. 6—Energy in the Magnetic Field
	Apr 1	W	Ch. 6—The Maxwell Equations
	Apr 3	F	Exam 2 (Chapters 3 and 4)
13	Apr 6	M	Ch. 6—Gauge Invariance of Electromagnetism
	Apr 8	W	Ch. 6—Green Functions for the Wave Equation
	Apr 10	F	Ch. 6—Poynting's Theorem
14	Apr 13	M	Ch. 6—Continued
	Apr 15	W	Ch. 6—Continued
	Apr 17	F	Ch. 6—Continued
15	Apr 20	M	Ch. 6—The Duality Transformation
	Apr 22	W	Catch-up Day
	Apr 24	F	Catch-up Day
16	Apr 27	M	Catch-up Day
	Apr 29	W	Catch-up Day
	May 1	F	Catch-up Day
17	May 6	W	Final Exam (10:15–12:30 p.m.)