Physics 5573
Electrodynamics I
Fall 2002

August 21, 2002

Instructor: K. A. Milton

Lecture: TF 2:30–3:45 pm, NH 201

Office: NH 127B—phone 325-3961 ext 36128 (on campus: 36128)

Office hours: MWF 12:00–1:30 pm, by appointment, or whenever you can catch me in my office.

Text: Classical Electrodynamics, by Julian Schwinger, Lester L. DeRaad, Jr., Kimball A. Milton, and Wu-yang Tsai (Advanced Book Program, Perseus Books/Westview Press, 1998).

Supplementary References: (On reserve in the Physics Library)

- J. D. Jackson, *Classical Electrodynamics*, John Wiley
- L. Landau and E. Lifshitz, *Classical Theory of Fields*, Pergamon
- L. Landau and E. Lifshitz, *Electrodynamics of Continuous Media*, Pergamon
- A. Sommerfeld, *Electrodynamics*, Academic Press
- J. Stratton, *Electromagnetic Theory*, McGraw-Hill

Dedication: Julian Schwinger's fundamental contributions to electrodynamics were important to the development of radar during World War II, and were a vital step in his solution of quantum electrodynamics a

few years later. The text for this course, a book which was completed in December 1997, grew out of highly original lectures Schwinger gave at UCLA in the late 1970s and early 1980s. I dedicate this course to his memory; Julian Schwinger, probably the most brilliant and influential physicist of the past several decades, died in 1994 at age 76.

Prerequisites: Although this course will start from the beginning of the subject, a two-term undergraduate course on electromagnetic theory will be presumed. The essential mathematical preparation is knowledge of the theory of complex variables, including contour integration, and the method of steepest descents.

Grading: The grade in this course will be based upon homework, which will be assigned approximately every week, and on three exams. The weighting will be as follows:

Homework	35%
Hour Exams ($2 \times 20\%$)	40%
Final Exam	25%

Late homework will not be accepted. The current regulations concerning dropping the course will be strictly followed. The examination schedule is as follows:

Exam I	Friday, September 27
Exam II	Friday, November 15
Final Exam	Friday, December 20, 1:30pm–3:30pm

Tentative Course Outline: This course will develop the foundations of electromagnetic theory, from Maxwell's equations to magnetic charge. Conservation laws and action principles will be emphasized. Electrostatics and magnetostatics will be treated in detail, with particular attention to Green's function techniques. (Radiation will be covered in Electrodynamics II.) Topics to be covered will be chosen from the first 30 chapters of the book.

Policy on Religious Holidays: "It is the policy of the University to excuse absences of students that result from religious observances and

to provide without penalty for the rescheduling of examinations and additional required classwork that may fall on religious holidays."

Reasonable Accommodation Policy: "The University of Oklahoma is committed to providing reasonable accommodation for all students with disabilities. Students with disabilities who require accommodations in this course are requested to speak with the professor as early in the semester as possible. Students with disabilities must be registered with the Office of Disability Services prior to receiving accommodations in this course. The Office of Disability Services is located in Goddard Health Center, Suite 166, phone 405/325-3852 or TDD only 405/325-4173."