PHYS 502A
Classical Electrodynamics
Fall 2025 Lectures

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Tuesdays, 5:30pm-6:50pm
Thursdays, 5:30pm-6:50pm

This is a one-semester graduate course in classical electrodynamics. It will cover the following topics:

- The Principle of Relativity
- Relativistic Mechanics
- The Principle of Least Action and Noether's Theorem
- Charges in Electromagnetic Fields
- Classical and Covariant Formulations of Maxwell's Equations
- Constant Electromagnetic Fields
- Electromagnetic Waves
- The Propagation of Light
- The Field of Moving Charges
- Radiation of Electromagnetic Waves

Most of these topics are discussed in the first nine chapters of the textbook "The Classical Theory of Fields" by L. D. Landau, and E. M. Lifshitz. The lectures will provide a synopsis of these chapters and emphasize the most important concepts and equations for each of the topics. Therefore, the "Classical Theory of Fields" (any year's edition) will be the main source of the course text, although making and having lecture notes in the class will be enough for both homework assignments and exams.

For additional reading, the following textbooks are recommended: "Classical Electrodynamics" by J. D. Jackson, and "Introduction to Electrodynamics" by D. J. Griffiths. All the three books are available in McPherson Library.

Assessment

The final assessment will be based on results of the homework assignments (3-4 assignments per the course with a two-week deadline each), midterm and final exams. Each assignment will contain a few problems intended to test how well the material from the preceding lectures has been learned. The midterm and final exams will consist of a larger number of problems similar to those previously given in the homework assignments. The contributions to the final assessment will be 40% from the homework assignments and 30% for each of the exams.