PHYS 422
Electromagnetic Theory
Spring 2016 Lectures
Elliott Building 161
Mondays and Thursdays, 10:00am-11:20am

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This is a one-semester upper-level undegraduate course in electromagnetic theory. It will cover the following topics:

- Electrodynamics

- Conservation Laws

- Electromagnetic Waves

- Potentials and Fields

- Radiation

- Electrodynamics and Relativity

These topics are discussed in the chapters 7 to 12 of the textbook "Introduction to Electrodynamics: Third Edition" by D. J. Griffiths. The lectures will provide a synopsis of these chapters and emphasize the most important concepts and equations for each of the topics. Therefore, the "Introduction to Electrodynamics"' (the corresponding chapters in its any year's edition) will be the main source of the course text, although making and having lecture notes in the class is also important for both successfully completing homework assignments and passing exams.

For additional reading, the following textbooks are recommended: "The Feynman Lectures on Physics, Volume II: Mainly Electromagnetism and Matter" by R. Feynman (any year's edition) and "Classical Electrodynamics" by J. D. Jackson.

A substantial time in the class and at home will be devoted to solving problems analytically and with the help of multiphysics software package COMSOL 4.3a.

Assessment

The final assessment will be based on results of the homework assignments (3-4 assignments per the course with an one- or two-week deadline each), midterm and final exams. Each assignment will contain a number of problems intended to test how well the material from the preceding lectures has been learned. One of the assignments will be setting up and solving an EMT problem of student's choice using the COMSOL. 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.