

SMU Spring 2010
Physics 1308 : Electromagnetism
Syllabus

Instructor : Will McElgin

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Office Hours : Tuesday, Wednesday, Thursday – 2-5pm

TA : Hang Qiu

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Text : Wolfson, “Essential University Physics : Vol 2”

Course Website : www.physics.smu.edu/mcelgin/P1308_spring2010/P1308.html

Lecture Times : Tuesday and Thursday – 9:30am-10:50am

Lecture Location : Fondren 158

Description of the Course

This course is intended as a calculus-based introduction to thermodynamics, electromagnetism, and related topics. Initially, there will be a discussion of thermal physics and the laws of thermodynamics. The concepts of electric charge, field, and potential will then be introduced. Following this, there will be a treatment of electric current, magnetism, and electromagnetic induction. Both direct and alternating circuit analysis will also be covered. To complete the foundations of electromagnetism, the last of Maxwell’s equations will then be introduced. This permits a description of light as electromagnetic radiation. Various topics in optical physics will be covered, including reflection and refraction, optical images, and interference and diffraction. Finally, a treatment of special relativity will be given. There will be an emphasis on in-class problem solving using similar ideas and techniques as required on homework and exams.

Evaluation

There will be two exams (25% each), and a semi-cumulative final (25%). Homework (25% total) will be collected approximately every two weeks. Attendance in class is strongly expected and, unless expressly told otherwise, students are responsible for all aspects of the class discussion.

Schedule

- 1/19** : Preliminaries, Heat, and Thermal Physics. Chapters 16 and 17.
Assignment of homework 1.
- 1/21** : Thermal Physics, and the First Law of Thermodynamics. Chapters 17 and 18.
- 1/26** : The First and Second Laws of Thermodynamics. Chapters 18 and 19.
- 1/28** : The Second Law of Thermodynamics. Chapter 19.
- 2/2** : Collection of homework 1.
Electric Charge and Force. The Electric Field. Chapter 20.
Assignment of homework 2.
- 2/4** : The Electric Field, and Gauss's Law. Chapters 20 and 21.
- 2/9** : The Electric Field, and Gauss's Law. Chapters 20 and 21.
- 2/11** : Gauss's Law. Chapter 21.
- 2/16** : Gauss's Law. Chapter 21.
- 2/18** : Gauss's Law. Chapter 21.
- 2/22** : Collection of homework 2.
- 2/23** : Exam 1. Assignment of homework 3.
- 2/25** : Electric Potential. Chapter 22.
- 3/2** : Magnetic Force and Fields. Chapter 26.
- 3/4** : Magnetic Force and Fields. Chapter 26.
- 3/16** : Magnetic Force and Fields. Chapter 26.
- 3/18** : Magnetic Force and Fields. Electromagnetic Induction. Chapters 26 and 27.
Assignment of homework 4.
- 3/23** : Electromagnetic Induction. Chapter 27.
Collection of homework 3.
- 3/25** : Electromagnetic Induction. Chapter 27.
- 3/30** : Electromagnetic Induction. Chapter 27.
- 4/1** : Exam 2. Collection of homework 4.
Assignment of homework 5.
- 4/6** : Maxwell's Equations and Light. Chapter 29.
- 4/8** : Maxwell's Equations and Light. Chapter 29.
- 4/13** : Maxwell's Equations and Light. Chapter 29.
- 4/15** : Collection of homework 5.
Reflection and Refraction. Chapter 30.

Assignment of homework 6.

4/20 : Reflection and Refraction. Chapter 30.

4/22 : Relativity. Chapter 33.

4/27 : Relativity. Chapter 33.

4/29 : Collection of homework 6.
Relativity. Chapter 33.

5/5 : Final Exam. Exam Time – 11:30am-2:30pm.