PHYS 3P36

Outline

Academic Integrity

Calendar entry

Course Outline

Brock calendar entry:

Magnetostatics, divergence and curl of magnetic field; magnetic vector potential; magnetic field in matter; magnetization; field of magnetic object; magnetic field inside of linear and non-linear media; electrodynamics; Ohm's law; Faraday's law and Maxwell equations; energy and momentum in electrodynamics; electromagnetic waves.
Lectures, 3 hours per week.
Prerequisites: PHYS 3P35.

Requirements:

It is important that the students feel comfortable with calculus (including multivariable and vector calculus), differential equations (both ordinary and partial), linear algebra, and complex numbers.

Textbook:

Recommended textbook:
J. Franklin, *Classical Electromagnetism* (Pearson, 2005).

Other suggested reading:
D. J. Griffiths, *Introduction to Electrodynamics*, 4th edition (Pearson, 2013)
J. D. Jackson, *Classical Electrodynamics*, 3rd edition (Wiley, 1999).

Note: In this course, we use Gaussian units, as in Franklin's book. The Griffiths and Jackson books use SI units.

Topics covered in the course:

- Mathematical tools: vector calculus
- Magnetostatics
- Magnetization and ferromagnetism
- Electrodynamics: Maxwell's equations, conservations laws
- Electromagnetic waves

Marking scheme:

- 4 assignments: 40% (10% each); assignments must be uploaded **by 5pm (EST) on the due date** to the course Brightspace page (submission instructions can be found here); late assignments will **not** be accepted
- midterm test: 20% (mode of delivery TBA)
- final exam: 40%; a student must achieve 50% on the final exam to pass the course; the final exam will be a **closed book** exam, with only a calculator and one self-prepared formula sheet (letter size, two-sided) allowed.