

Physics 5P30: Advanced Electromagnetism

2017-2018 Instructor: Dr. David Crandles
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Calendar Description

Electromagnetic wave propagation in vacuum, dielectrics, conductor and ionized gases; wave guide and transmission line propagation; dipole and quadrupole radiation fields; relativistic transformation of the electromagnetic fields; radiation by moving charges.

Syllabus

1. Review: Maxwell's Equations
2. Electromagnetic Waves and Waveguides
3. Radiation
4. Dispersion, Linear Response Theory

Evaluation

Assignments	25%	approximately 1 per week
Mid-Term Exam	25 %	mid - february
Final Exam	50 %	

Academic Integrity

Academic misconduct is a serious offence. The principle of academic integrity, particularly of doing ones own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should consult Section XVII, Academic Integrity/Misconduct, in the Academic Regulations and University Policies entry in the Graduate Calendar to view a fuller description of prohibited actions, and the procedures and penalties.

Reference Texts

There is no required text for this course. The graduate texts by Jackson and Franklin listed below have been placed on 1 day reserve. Be aware that some texts may use Gaussian units although my lecture notes will be in SI units.

Graduate Texts

Electromagnetic Theory for Microwaves and Optoelectronics, Zhang and Li (Berlin: Springer, 1998) - **Electronic Copy in Brock Catalog**

Classical Electrodynamics, 3rd ed., J.D. Jackson (New York: Wiley, 1999).

Classical Electromagnetism, J. Franklin (San Francisco: Addison-Wesley, 2005)

Electromagnetic Theory Julius Stratton (New York: McGraw-Hill, 1941)

Classical Electricity and Magnetism, Panofksy and Phillips (Reading: Addison-Wesley, 1962)

Electrodynamics of Continuous Media, Landau and Lifshitz (Oxford: Pergamon Press, 1960)

Undergraduate Texts - This material will be assumed in this course

Introduction to Electrodynamics, 3rd ed., D.J. Griffiths (Upper Saddle River: Prentice-Hall, 1999)

Electromagnetic Fields, R.K. Wangsness (New York: Wiley, 1979)

Mathematical Methods

Mathematical Methods for Physicists, 2nd ed. G. Arfken, (New York: Academic, 1970).

Mathematical Methods in the Physical Sciences, 3rd ed., Mary Boas, (New York: John Wiley & Sons, 2006).