

# Physics 301

## Electromagnetic Fields Fall Semester 2014

*Room:* Seaver Hall 109  
*Time:* MW 1:00 - 2:15pm

*Instructor:* Dr. Gabriele Varieschi  
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*Office hours:* Mon., Wed. 10:00 am – 11:30 am; and by appointment.  
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*Required Text:* **David J. Griffiths – Introduction to Electrodynamics – Fourth Edition – Prentice Hall** (we will try to cover chapters 1-5 of this book in the first semester; we will finish the book during the second semester).

*Other useful books:* Serway – Physics for Scientists and Engineers, Vol.2 – Cengage (for an elementary introduction to electromagnetism).  
*(not required)* Reitz, Milford & Christy – Foundations of Electromagnetic Theory – Addison Wesley (another popular undergraduate text).  
John D. Jackson – Classical Electrodynamics – Wiley (a leading graduate level textbook).

*Objectives and Topics:* We will cover several chapters of the textbook in the following order:  
Part I – Vector analysis: review of vector algebra, differential and integral calculus with vectors, systems of coordinates, Dirac delta function.  
Part II – The electric field: electrostatics, electric potential, work and energy, conductors, Laplace’s equation and other advanced methods, polarization and electric field in matter.  
Part III – Magnetostatics in vacuum: magnetic field and forces, Biot-Savart law, Ampere’s law and magnetic potential.

**Prerequisite: PHYS 201, PHYS 206; MATH 355 or concurrent enrollment.**

*Learning Outcomes:* Understand the foundations of classical electromagnetism from a more advanced point of view. Conceptually understand the theoretical framework of electromagnetic fields and related Maxwell equations. Be able to solve problems of increasing complexity, dealing with the applications of electromagnetism.

*Tests:* There will be two/three tests during the semester. They will all count toward your final grade, so please try not to miss any of them.

*Test Dates:* TBA

*Final Exam:* Dec. 11, Thursday – 2:00pm-4:00pm  
The final exam is cumulative and is equivalent to 2 tests.

*Homework:* Homework assignments will be given, typically one for each chapter of the book. Problem sets will be collected, graded, and will count toward the final

grade. Solutions to the problems will be reviewed in class, with student participation.

<i>Grading:</i>	Class Attendance & Participation	10 %
	Homework	15 %
	Test 1	15 %
	Test 2	15 %
	Test 3	15 %
	Final Exam	30 %

*Grading (approx.):* <50%=F; 50-54%=D; 55-69%=C range; 70-84=B range; >84=A range.

*Academic Honesty:* Academic dishonesty will be treated as an extremely serious matter, with serious consequences that can range from receiving no credit for assignments/tests to expulsion. It is never permissible to turn in any work that has been copied from another student or copied from a source without properly acknowledging the source. It is your responsibility to make sure that your work meets the standard of academic honesty set forth in the "LMU Honor Code and Process" in the Undergraduate Bulletin.

*Syllabus changes:* If necessary, this syllabus and its contents are subject to revision; students are responsible for any changes or modifications announced in class.

**Have a good semester. Good luck !**