Course Description: This course is a one semester introduction to electricity and magnetism. It is the second course in a four semester introductory sequence that includes Physics 105 and Physics 201-202 or 309-310. As such, it is primarily intended for students who are planning to take at least two years of physics courses. Students planning to take a single year of physics should consider the introductory 101-102, 103-104 or 107-108 sequences. The goal of this course is to give a solid grounding in the core topics of classical electricity and magnetism, and to prepare students for further study in physics. It will not contain a survey of “Modern Physics” such as found in Physics 102 or 104. Calculus will be used in keeping with the students’ level of math preparation, and additional mathematical techniques will be introduced as needed.

Prerequisites – Physics 171.105 or either Physics 171.101 or 103 or 107 and permission of the instructor.
Corequisites – Introductory Physics Laboratory 173.116, and Calculus 110.109 or higher level mathematics course.

Textbooks:
Recommended: Used Math by Clifford Swartz
The required text is a classic book by Purcell that has been updated to mks units and augmented with more problems. You’ll find that it has more mathematical sophistication than most introductory texts and is closer in style to books you’ll see in later courses. You might find it useful to look at the same material in a more standard introductory book like Halliday and Resnick or the more advanced book by Griffith “Introduction to Electrodynamics” that has been used in the junior level course.

Supplementary material will be posted on Blackboard. It will cover things that are not in Purcell and Morin, including ray optics and a nonrelativistic treatment of magnetism. The Used Math book is a useful primer/reminder for the math used in the course. The required math will be introduced as we go along.

SCHEDULE
Week 1 (Jan. 26): Units, Coulomb’s law, the electric field (Chapter 1)
Week 2 (Feb. 2): Gauss’s law, electrostatic potential (Chapter 1-2)
Week 3 (Feb. 9): Potential, calculus on vectors (Chapter 2)
Week 4 (Feb. 16): E-fields around conductors, capacitance (Chapter 3)
Week 5 (Feb. 23): Capacitance, conductance (Chapter 3-4)
Week 6 (March 2): Currents, networks & RC circuits (Chapter 4)
Week 7 (March 9): More vector calc., magnetic field (Chapter 6)
Week 8 (March 23): Induction, Faraday’s law
Week 9 (March 30): AC circuits (Chapter 8)
Week 10 (April 6): Maxwell’s Eqns., EM waves (Chapter 9)
Week 11 (April 13): Electric fields in matter (Chapter 10)
Week 12 (April 20): Optics (handout)
Week 13 (April 27): Magnetic fields in matter (Chapter 11)