PHYS 333

Information for Exam I

Time: Friday, September 19, 11:00–11:52 a.m.

Office Hours: Monday 2:00–4:00pm; Tuesday a.m. by appointment; Wednesday after 3:30; Thursday a.m. by appointment, p.m. after 3:00

This will be a closed book examination. You are responsible for the material in Griffiths 1.1–1.5 and 2.1–2.2 (excluding subsections 1.1.5, 1.2.7, 1.3.6)

I will provide you with copies of the inside covers of your text, as well as photocopies of the figures representing differential volume elements in cylindrical and spherical coordinates. I will not provide you with any other formulas — there are really very few of them, and they are so important that you should know them.

The exam questions will be similar to the homework problems you have already done and to the worked examples in the text. You should be able to:

- Evaluate volume integrals.
- Evaluate surface integrals.
- Evaluate line integrals.
- Sketch 2-D vector fields starting from algebraic representations.
- Identify points in an illustrated vector field that have zero divergence, and points that have a non-zero divergence.
- Identify points in an illustrated vector field that have zero curl, and points that have a non-zero curl.
- Verify the Gradient Theorem, the Divergence Theorem, and the Curl Theorem for given vector fields and specified points, paths, surfaces, and or volumes.
- Calculate the electric field at a point due to a set of discrete point sources.
- Calculate the electric field at a point due to a continuous charge distribution. You should be able to do this using Gauss's Law for highly symmetric charge distributions and Coulomb's Law (with superposition) for distributions that don't exhibit enough symmetry to make Gauss's Law useful.
- Evaluate integrals with Dirac delta-functions in the integrand.