24.8200 Engineering Electromagnetics

ASSIGNMENT 1

Due Date: Tuesday September 19, 2006   **Instructor:**   **J. LoVetri**

1)   Start with Maxwell's equations and derive Coulomb's law for the electrostatic field of a point charge. Show all steps and state all assumptions.

2)   Start with Maxwell's equations and derive the Biot-Savart law for the magnetostatic field of a current element Idl directed in an arbitrary direction s. Show all steps and state all assumptions.

Note: You can use any references you like, but make sure that your solution is complete. There are several correct ways to do these derivations; you can start from the potentials if you like. (Classical derivations for both problems can be found in Stratton §§3.4 and 4.4, but other references will do.)