

## Lab Assignment No. 1: Matrix Operations

PSGA7816 Multivariate Statistical Analysis

In completing your assignment you are expected to show every step in your work. You are encouraged to use Microsoft Word Equation Editor (which is part of every standard installation of the MS Office suite), MathType or MATLAB in order to facilitate the clarity of your work. However, this should not prevent you from showing your work.

If you do not wish to use either one of these software extensions you may hand write your assignment. However, please **do not use pencil** and write as clearly as possible so as to avoid confusion when grading your answers.

Along with your long-hand answers please verify your computation/work using your software program of choice (SAS, SPSS, R, STATA etc.). Please attach a copy of your syntax (**not output**) to the assignment you will be turning in. No e-mail submissions will be accepted. The assignment is due **January 29, 2009 at 1:30 PM**.

- 1) Given the matrix K, identify elements  $k_{31}$ , and  $k_{23}$ .

$$K = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix}$$

- 2) What would a vector (vk) created from the diagonal of matrix K look like?
- 3) What is the product of vector vk post multiplied by the corresponding transposed 1-vector?
- 4) Is the result in Question 3 an identity matrix? Explain?
- 5) What is the product of vector vk pre multiplied by the corresponding transposed 1-vector?
- 6) What is the trace of matrix K?
- 7) What is the determinant of matrix K?
- 8) What is the inverse of matrix K?
- 9) What is the product of post multiplying matrix K by its inverse?
- 10) Write out the equations and solve the system of linear equations.

$$\begin{bmatrix} 3 \\ 3 \\ 1 \end{bmatrix} = K \times \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$$