**STAT 441/541 Statistical Methods II**

**Handout: Multiple Regression Part 1**

**Ag Data Example**

**The dataset is Excel file: Ag Data.xlsx**

A soil scientist wants to relate the daily evaporation from the soil to soil temperature, air temperature, relative humidity, and total wind. The scientist collects data at a number of locations in Texas on the variables maximum, minimum, and average soil temperature ; maximum, minimum, and average air temperature ; maximum, minimum, and average relative humidity ; and total wind . The response is the daily amount of evaporation from the soil .

A subject matter expert recommended looking at independent variables related to air temperature and relative humidity by fitting the following model:

(a) Looking at the scatterplot matrix:

(i) Describe relationships between the dependent variable and independent variables and .

(ii) Describe the relationship between independent variables and .

(b) Examine correlations for all pairs of variables:

(i) Are there any significant correlations between the dependent variable and independent variables and at a significance level of ?

(ii) Is there significant correlation between independent variables and at a significance level of ?

(c) Give the estimated regression model and interpret the estimated slope parameters for independent variables and .

(d) Perform an overall F test for the proposed multiple regression model using the five-step method using a significance level of :

Hypotheses:

Test Statistic:

P-value:

Decision about the null hypothesis:

Conclusion:

(e) Test each of the partial slope parameters in the proposed model using the five-step method using a significance level of :

(i) Test for :

Hypotheses:

Test Statistic:

P-value:

Decision about the null hypothesis:

Conclusion:

(ii) Test for :

Hypotheses:

Test Statistic:

P-value:

Decision about the null hypothesis:

Conclusion: