# MATH 1560 STATISTICAL ANALYSIS II

**3 Credits**
**Offered in Lecture Format**
**Prerequisite required (MATH 1550 with a grade of C or better)**

**SYLLABUS**

## I. HYPOTHESIS TESTS FOR MEANS AND PROPORTIONS

A. One and two sided tests
B. Significance levels
C. Power of a test
D. Determining minimum sample sizes

## II. SIMPLE LINEAR CORRELATION AND REGRESSION ANALYSIS

A. Correlation analysis
   1. Scatterplot
   2. Coefficient of correlation
   3. Coefficient of determination
   4. Inferences about the correlation coefficient
B. Regression analysis
   1. Assumptions
   2. Least square estimates
   3. Normal equations
   4. Inferences about slope $\Downarrow$
   5. C.I. estimates of $\mu_{y \mid x = x_o}$ and an individual y for $x = x_o$
C. Anova table and F tests
D. Equivalence of tests
   1. $H_0$: $\rho = 0$
   2. $H_0$: $\beta = 0$
   3. $H_0$: No regression - F test in anova table
E. Trend analysis
   1. Long term trend line
   2. Seasonal indices

## III. MULTIPLE REGRESSION

A. Development of normal equations
B. Partitioning of sums of squares and the resulting anova table
C. Analyzing importance of predictors
   1. Standardized coefficients
   2. Tests for individual coefficients
   3. Tolerance
   4. Part correlation coefficients
   5. Partial correlation coefficients
D. Analysis of model
   1. Standard error of estimates
   2. Multiple R, $R^2$
   3. Adjusted R
   4. Testing the importance of a set of predictors - full, reduced models
E. Non-linear regression

F. Dummy variables

## IV. ANALYSIS OF VARIANCE

A. One way
   1. 2 treatments - compare with t-test for independent samples
   2. More than 2 treatments
   3. Blocking

B. Two way - with and w/o interaction

C. Three way - with and w/o interaction

D. Multiple comparisons
   1. Scheffé
   2. Duncan