SYLLABUS

STAT 320: Data analysis using regression models

Spring Semester 2006

Instructor:	Professor H. Bensmail Office Room 334 SMC, Phone 974-8325 (Department) E-Mail: **bensmail@utk.edu**
Office Hours:	Monday 3p.m- 5p.m. or by appointment. Wednesday 3p.m -5pm or by appointment. TA: Suman katraga
Course Time & Place:	Section 0001 MWF 11:15pm-12:05pm. Humanities 202
Text & Lecture Notes:	Lecture Notes on: **Data analysis using regression models by Dr. H. Bensmail** (in preparation-sole author) and Book: " Applied Regression Analysis" by Terry Dielman
Statistical Software & Calculator:	JMP software. A scientific calculator with statistical functions.
Prerequisites:	Stat 201, or equivalent.
Course Description & Contents	This course will briefly review the normal probability model and sampling distributions, interval estimation, hypothesis testing, and two sample tests. It will include and cover the core topical areas such as analysis of variance, simple linear regression, simple times series analysis, multiple regression, use of dummy variables, model selection and evaluation, selection of best predictor variables, regression diagnostics, and categorical data analysis techniques. The primary emphasis of the course will be to set down these statistical methods and to link them to real data applications, interpretation of the results. Use of computers computer facilities, and statistical software such as JMP are required.

Course Grade & Evaluation:	Homework	100 points	15%
	Test 1	100 points	15%
	Test 2	100 points	20%
	Test 3	100 points	20%
	Final Exam	100 points	30%
	Total	**500 points**	**100%**

Homework

You may bring my notes for each exam. Bring your calculators to class all the time. Homwork will be assigned on a regular basis, each Friday, after the Lab class and you will be asked to return them during each Wednesday. You are encouraged to work your homework and write-up your solutions on your own. It is advised that you work out all the homework problems.

Quizzes Sometimes...

Test 1 February 19, 2006
Test 2 March 19, 2006
Test 3 April 16, 2006

Chapters:

Chapter 1

1. What is statistics
2. Introduction
3. What is regression
4. **Home_Assignment 1: Friday, January 27**
   Home_Assignment 2: Friday February 3

Chapter 2

1. Identifying and Summarizing Data
2. Idealized Histograms as Representations of Data
3. Drawing an Individual Entity At Random
4. Samples versus Populations and the Logic of Statistics
5. Random Sampling
6. Interval Estimation
7. What if? - The Role of Testing Hypotheses
8. The Concept of Random Error
9. **Home_Assignment 3: Friday February 10**

Chapter 3

1. Identifying and Summarizing Data
2. Scatterplot
3. Basic Linear Regression Model
4. Is the Model Useful?
5. What the Modeling Procedure Tells Us
6. Improving the Model Through Residual Analysis
7. Case Study
8. **Home_assignment 4: Friday 17, 2006**
   Home_assignment 5, February 24, 2006

Chapter 4

1. Identifying and Summarizing Data
2. Linear Regression Model
3. Basic Checks of the Model
4. Random error, the variability, Residuals
5. Anova table
6. Is the model adequate
7. Is an explanatory variable important?
8. Visualizing Multivariate Regression data
9. Added Variable Plots/partial correlation
10. Some Special Independent Variables (binary and categorical)
11. Interaction term-polynomial regression
12. Indicators and Several Continuous Variables
13. Is a Group of Independent Variables Important?
14. **Home_Assignment 6: March 03, 2006**
    Home_Assignment7: March 10, 2006

Chapter 5

1. Categorical variable
2. Regression and Categorical Variables with 3 Levels
3. Fitting Categorical Variables with Indicators
4. One factor ANOVA model
5. Test of Equality of the Means
6. Hospital Charges Case Study
7. **Home_Assignment 8: Friday March 17**
8. **Home_Assignment 9: Friday March 24**

Chapter 6

1. Automatic Variable Selection Procedures
2. Stepwise Regression Algorithm
3. Residual Analysis:Standardized Residuals
4. Use Residuals to Detect Relationships with Explanatory Variables
5. Leverage
6. Collinearity

7. How can we detect collinearity?: Variance Inflation Factors, Collinearity and Leverage, Variables
8. Basic Selection Criteria Cp Statistic, Model Validation, PRESS Statistic
9. Home_Assignment 10: Friday March 31
10. **Home_Assignment 11: Friday April 07**

Chapter 7

1. Regression using Binary Dependent variables
2. Estimation using Least Squares Regression
3. Criticisms of Least squares method
4. Odds ratio
5. Logistic regression: Classification and discrimination
6. **Home_Assignment 12: Friday April 14**

Home_Assignment 13: Friday April 28

Chapter 8

1. Basic Longitudinal Data Vocabulary
2. Identifying and Summarizing Data
3. Random Process and Random Walk Models
4. Inference using Random Walk Models
5. Detecting Nonstationarity
6. Filtering to Achieve Stationarity
7. Forecast Evaluation

Chapter 9:

1. Identifying and Summarizing Data
2. Autoregressive Models of Order One
3. Estimation and Diagnostic Checking
4. Smoothing and Prediction
5. Case Study: 1986 Daily Standard & Poor's Returns
6. General Autoregressive Models

SOME IMPORTANT DATES TO REMEMBER Spring05

January 11 Classes Begin.

January 16 M.L.K day

March 20-25 Spring Break

Class end on April 30