Statistical Methods I: Topics in Regression Analysis, Correlation and Analysis of Variance  
Math 646/746  
Fall 2009  
Course Syllabus

Instructor: Dr. Jayawardhana     Phone: 235-4414  
Office: 207 Yates Hall     e-mail: ananda@pittstate.edu  
Office Hours: Check the timetable below  
Class web page: http://faculty.pittstate.edu/~ananda/STATMETHODI/statmeth1.html  
Web page for examples: http://faculty.pittstate.edu/~ananda/STATMETHODI/fun.html


Prerequisites: Math 543 (Probability and Statistics)

Coverage: Simple Linear Regression, Multiple Linear Regression, Correlation Analysis, Analysis of Variance, and SAS programming basics.

Part I Simple Linear Regression  
Chapter 1. Linear Regression with One Predictor Variable  
Chapter 2. Inferences in Regression and Correlation  
Chapter 3. Diagnostic and Remedial Measures  
Chapter 4. Simultaneous Inferences and Other Topics in Regression Analysis  
Chapter 5. Matrix Approach to Simple Linear Regression

Part II Multiple Linear Regression  
Chapter 6. Multiple Regression I  
Chapter 7. Multiple Regression II  
Chapter 8. Regression Models for Quantitative and Qualitative Predictors  
Chapter 9: Building the Regression Model I: Model Selection and Validation  
Chapter 10: Building the Regression Model II: Diagnostics  
Chapter 11: Building the Regression Model III: Remedial Measures*?????  
Chapter 12: Autocorrelation in Time Series Data*?????

Part IV: Design and Analysis of Single Factor Studies  
Chapter 15: Introduction to the Design of Experimental and Observational Studies  
Chapter 16: Single Factor Studies  
Chapter 17: Analysis of Factor Level Means  
Chapter 18: ANOVA Diagnostics and Remedial Measures
Objectives: First objective of this course is to learn in detail about the assumptions, how to check the assumptions, how to correct the violations of the assumptions, and how to apply the mathematical theory and statistical programming to regression and interpret the results.

Second objective of this course is to learn in detail about the correlation and how to apply the mathematical theory and statistical programming to correlation and interpret the results.

Third objective of this course is to learn in detail about the assumptions, how to check the assumptions, how to correct the violations of the assumptions, and how to apply the mathematical theory and statistical programming to analysis of variance and interpret the results.

Forth objective of this course is to improve the skills of statistical thinking and writing statistical reports.

Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
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<tbody>
<tr>
<td>Mid term exam (take home)</td>
<td>75</td>
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<tr>
<td>Mid term exam (in class)</td>
<td>25</td>
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<tr>
<td>End of semester exam (take home)</td>
<td>75</td>
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<td>End of semester exam (in class)</td>
<td>25</td>
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<tr>
<td>Homework</td>
<td>200 (rescaled)</td>
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<td>Quizzes</td>
<td>100</td>
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<td>Semester paper (and presentation)</td>
<td>25</td>
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<tr>
<td>Group projects</td>
<td>40</td>
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Grading Scale:

- 90% - 100% = A
- 80% - 89%  = B
- 70% - 79%  = C
- 60% - 69%  = D
- <60%       = F

Instructor keeps the right to lower the scale if necessary. Homework assignments are often different in length. Students will have the opportunity to submit homework up to a week late twice during the semester. After that late homework will not be graded. If you get a call during the class, please walk outside and answer. **I will not tolerate students playing with electronic gadgets in class.**

Other references:


Learn how to search online databases.

Learn how to request an inter-library loan.

We have access to many databases including JSTOR. In JSTOR, search for Regression Analysis. There may be several hundred papers. Read a few and select one article for your presentation.

Regression Analysis is a vast subject and its applications can be found in many areas of social sciences and business. Since we have covered only a limited number of topics during this semester, you may encounter many new concepts in research papers. I will help you to understand those topics if possible.

**Semester Papers and Class Presentations**

These papers should be from about 5-10 pages in length (double-spaced, font size 12). You have the choice to select your own topic. If you do so please let me know in advance. You can use publicly available data sets for your analysis. Instructor will help you find a topic if you do not want to find your own topic.

**Group Projects**

You are expected to critique the statistical analysis of four articles provided by the instructor. You may consider these as reaction papers. You can discuss with your classmates but write papers individually. These papers should be 2 to 3 pages long. There will be a class discussion afterwards.
Instructor’s Time-table

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<tr>
<td>8.00-8.50 MWF</td>
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<td>9:30-10.45 TH</td>
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<td>10.00-10.50 MWF</td>
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Programming for the class.

- SAS using PC
- MINITAB
- EXCEL