Course Objectives:

Prerequisites: STAT 501.

Textbook

Package:
1. R statistical language

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Assessment
Assessment for this course will be based on homework, term report, 2 major exams and a comprehensive final exam, as in the following:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework, Quizzes, Attendance and Class participation</td>
<td>10%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>20%</td>
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<tr>
<td>Term Paper Report</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam (Comprehensive)</td>
<td>35%</td>
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</table>
Tentative syllabus

The main objective of the course is to provide a deeper understanding of theory and applications of Regression Analysis. The course will help graduate students in learning advance modeling techniques and analyzing real data sets using R statistical language.

Topics:

- Simple Linear Regression
- Matrix approach to Simple and Multiple Linear Regression Analysis
- Model Selection and Validation
  - Model building process
  - Criteria for model selection
  - Automatic search procedures for model selection
- Model Diagnostics
- Remedial Measures
  - Weighted least squares
  - Ridge Regression
  - Robust Regression
  - Bootstrapping
  - Nonparametric regression
- Regression models for Quantitative and Qualitative Predictors
  - Polynomial regression models
  - Interaction regression models
  - Qualitative predictors
- Autocorrelation in Time Series Data
  - Problems of Autocorrelation
  - Remedial measures for Autocorrelation
  - Forecasting with Auto-correlated error terms
- Intro to Nonlinear Regression Models
- Regression Models with Binary Response
- Simple and Multiple Logistic Regression
- Poisson Regression
- Regression Approach to ANOVA