

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 510: Regression Analysis - Term 142 (3-0-3)

Course Objectives:

Simple linear regression and multiple regressions with matrix approach. Development of linear models. Inference about model parameters. Residuals Analysis. Analysis of variance approach. Selection of the best regression equation. Using statistical packages to analyze real data sets.

Prerequisites: STAT 501.

Textbook

M.H. Kutner, C.J. Nachtsheim, J. Neter and W. Li (2005). Applied Linear Statistical Models. Fifth Edition, McGraw-Hill International.

Other Reference books:

Johnston, J. and Dinardo, J. (1997). Econometric Methods, Fourth Edition, McGraw-Hill International.

Rawlings, J. O., Pantula, S. G. and Dickey, D. A. (1998). Applied Regression Analysis: A Research Tool, Second Edition, Springer

Package:

1. R statistical language

Instructor: Dr. Saddam Akber Abbasi

Office: Bldg – 5, room – 318. **Phone:** 4546

Assessment

Assessment for this course will be based on homeworks, term project, a major exam and a comprehensive final exam, as in the following:

Activity	Weight
Homework, Quizzes, Attendance and Class participation	10%
Exam 1	30%
Term Project	15%
Final Exam (Comprehensive)	45%

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 Linear Regression
- Matrix approach to Multiple Linear Regression
- Regression models for Quantitative and Qualitative Predictors
 - Polynomial regression models
 - Interaction regression models
 - Qualitative predictors
- 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
- 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