

Department of Statistics & Operation Research
College of Science, King Saud University
STAT 332 – Regression Analysis

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Course Scope and Contents:

This course is an introduction to applied data analysis. We will explore data sets, examine various models for the data, assess the validity of their assumptions, and determine which conclusions we can make (if any). Data analysis is a bit of an art; there may be several valid approaches. We will strongly emphasize the importance of critical thinking about the data and the question of interest. Our overall goal is to use a basic set of modelling tools to explore and analyse data and to present the results in a scientific report. We then consider simple linear regression, a model that uses only one predictor. After briefly reviewing some linear algebra, we turn to multiple linear regression, a model that uses multiple variables to predict the response of interest. For all models, we will examine the underlying assumptions. More specifically, do the data support the assumptions? Do they contradict them? What are the consequences for inference? Also, we will explore some nonlinear models and data transformations. Finally, we discuss Linear regression based on the categorical with some applications.

COURSE SYLLABUS

Week	Date	Topics Covered
1	21/1/1443 (29/8/2021)	Introduction and some basic concepts of probability and statistics
2	28/1/1443 (5/9/2021)	Definition of the Simple linear regression model with some applications
3	5/2/1443 (12/9/2021)	Estimation of the unknown parameters of the simple linear regression model
4	12/2/1443 (19/9/2021)	Properties of the least square method
5	19/2/1443 (26/9/2021)	Confidence estimation of the least square estimated of the coefficient of simple linear regression model.

6	26/2/1443 (3/10/2021)	Hypotheses Testing of the simple linear regression model
7	4/3/1443 (10/10/2021)	The efficiency of the simple linear regression model by using ANOVA
8	11/3/1443 (17/10/2021)	Predication and residual analysis of the simple linear regression model
9	18/3/1443 (24/10/2021)	Nonlinear regression models and data transformations
10	25/3/1443 (31/10/2021)	Like-of-fit test
11	2/4/1443 (7/11/2021)	Multiple linear regression model
12	9/4/1443 (14/11/2021)	Estimation of the unknown parameters of the multiple linear regression model.
13	16/4/1443 (21/11/2021)	Hypothesis testing of the multiple linear regression model
14	23/4/1443 (28/11/2021)	Prediction and residual analysis of the multiple linear regression model
15	1/5/1443 (5/12/2021)	Stepwise regression and model selection
16	8/5/1443 (12/12/2021)	Revision and Applications

Data and solutions:

<http://users.stat.ufl.edu/~rrandles/sta4210/Rclassnotes/data/textdatasets/Chapter%20%206%20Data%20Sets.html>

Textbook:

Applied Linear Regression Models, Fifth Edition by Kutner, Nachtsheim and Neter.

Grading:

First Midterm: 24%

Second Midterm: 24%

Assignments, Quizzes and projects : 12%

Final Exam: 40%

Computing:

In this course, we use R language as a computing platform.