

King Fahd University of Petroleum and Minerals

Department of Mathematics

MATH-587: Advanced Applied Regression (Term 232)

Instructor: Dr. Nasir Abbas

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Office Hours: UT 11:50 AM to 01:50 PM or by appointment

Course Description: Least square method and properties. Simple and multiple linear regression with matrix approach. Development of liner models. Residual analysis. Polynomial models. Use of dummy variables in multiple linear regression. Analysis of variance approach. Selection of ‘best’ regression equation. Concepts of mathematical model building. Non-linear regression and estimation. Extensive use of computer packages.

Learning Outcomes: By completing this course, students should be in a position to

- discussing ordinary least square approach
- handling simple and multiple linear regressions models
- using analysis of variance technique
- exploring non-linear models
- analyzing results using software

Textbook: *Applied Regression Analysis and Generalized Linear Models* by John Fox, 3rd edition, SAGE Publications 2015.

Reference Books:

- *Applied Linear Statistical Models* by M.H. Kutner, C.J. Nachtsheim, J. Neter and W. Li, 5th edition, McGraw-Hill International 2005.
- *Introduction to Linear Regression Analysis* by Montgomery, Peck and Vinning, 5th edition, Wiley (2012).

Assessment*

Activity	Weight
Homework and Quizzes	15%
Midterm Exam	30%
Project and Presentation	20%
Final Exam (Comprehensive)	35%

Important Notes:

Blackboard: All contacts or announcements between the instructor and the students are supposed to be through Blackboard, so the student must check his Blackboard at least once a day.

Academic Integrity: All KFUPM policies regarding ethics and academic honesty apply to this course.

Attendance Notes:

- In accordance with University rules, 20% unexcused absences will automatically result in a grade of DN.
- Attendance on time is very important. Mostly, attendance will be checked within the first two minutes of the class. Entering the class after that, is considered as one late, and every two times late equals to one absence.

Tentative list of Course Contents to be covered:

Chapter	Topic	Weeks
2	What is Regression Analysis?	½
3	Examining Data	½
4	Transforming Data	1
5	Linear Least-Squares Regression	2
6	Statistical Inference for Regression	2
7	Dummy-Variable Regression	1
8	Analysis of Variance	1
9	Statistical Theory for Linear Models	2
10	The Vector Geometry of Linear Models	1
11	Unusual and Influential Data	1
12	Diagnosing Non-Normality, Nonconstant Error Variance, and Nonlinearity	2
13	Collinearity and Its Purported Remedies	1
14	Logit and Probit Models for Categorical Response Variables	If time allows