

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA
MATH 560: APPLIED REGRESSION AND EXPERIMENTAL DESIGN

Instructor: Muhammad Riaz
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Course Description (3-0-3)

Simple linear regression. Testing of intercept and slope. Multiple linear regression. Estimation parameters and testing of regression coefficients. Prediction and correlation analysis. Analysis of variance technique. Completely randomized and randomized block designs. Latin square design. Incomplete block design. Factorial design, 2k factorial design and blocking and confounding in 2k factorial design.

Prerequisite: STAT 201, STAT 319, or Instructor's Consent. (Students cannot receive credit for both MATH 560 and STAT 430 or SE 535)

Text and Package:

- (1) **Text:** Montgomery, D.C. (2019). Design and Analysis of Experiments. 10th edition, Wiley, New York.
- (2) Software: **MINITAB**

Course Objectives:

MATH 560 is intended to be a foundation course in Design and analysis of experiments and regression analysis. The emphasis is on understanding how to use experimental designs and regression analysis to solve real-world problems. Upon completion of this course you should:

- Be familiar with different experimental designs and their analysis
- Understand the basic elements of Regression analysis;
- Understand the assumptions, methods, and implications associated with various methods of experimental designs and regression analysis;
- Be proficient in using *MINITAB* and be able to interpret the associated output.

Assessment

Activities	Weight
Class Activities (Assignments, Quizzes and participation)	15%
Mid Term	30%
Final exam (comprehensive)	40%
Project	15%

Grades: The letter grades will assigned based on relative performance of the registered students.

Academic Integrity

All KFUPM policies regarding **ethics** and **academic honesty** apply to this course.

Notices:

Any notice about the course will be communicated to the students through blackboard.

Syllabus:

Week	Topic
1	Designs of Experiments + Basic Statistical Methods
2	Designs of Experiments + Basic Statistical Methods
3	Analysis of Variance
4-5	Experiments with blocking Factors
6	Factorial Experiments
7-8	Two Level Factorial Designs
9	Blocking and Confounding for Two Level Factorial Designs
10	Two level Fractional Factorial Designs
11-12	Other Topics on Experimental Designs
13-14	Regression Modeling
15	Random Effects Model
16	Projects Discussions

Project Description

The project should be based on a real problem (with complete description) and a detailed analysis using the skills developed in the course. There should be some concluding remarks that refer to the real implications of your chosen problem, preferably in your major area. You may use online sources in your project with proper citation/reference.

Project Requirements:

- Each group should contain a maximum of 5 students.
- Each group should submit the following:
 - a formal report (pdf)
 - a power point presentation

Deadline: The end of semester (before the last day of classes)

Submission: email submission to riazm@kfupm.edu.sa + A Hard copy