**KING FAHD UNIVERSITY OF PETROLEUM & MINERALS**
**DEPARTMENT OF MATHEMATICS & STATISTICS**

**STAT310: Linear Regression**
**Term 142**

**Instructor**: Walid S. Al-Sabah

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**Office Hours:**
Sunday, Tuesday, Wednesday and Thursday 11:00 am – 12:00 noon
Wednesday 2:00 – 3:00

Class meets UTR 10:00 – 10:50 am in 59-1015.
Recitation/problem Session: W 3:00 – 4:30 in 5-202

Check Blackboard regularly for announcements

**Course Objectives:**  Present the basics of regression analysis

**Textbook:**       Introduction to Linear Regression Analysis
                    Montgomery, Peck and Vinning, 5th edition, Wiley (2012).

**Learning Outcomes :** At the end of the term a student should be able to
   ➢ Find and interpret least square estimates of parameters
   ➢ Thouroughly understand and use the single linear regression model
   ➢ Thouroughly understand, build and use the multiple linear regression
   ➢ Perform hypothesis tests and construct confidence intervals in linear regression models
   ➢ Test the appropriatness of models, and analyze data

**Assessment:**

| Activity | Weight |
|---|---|
| *Homework* | 10% |
| *First Major Exam -  Chapters 1, 2, 3, and 4* | 15% |
| *Second Major Exam – Chapters 5, 6 and 7* | 15% |
| *Project* | 30% |
| *Final Exam (Comprehensive)* | 30% |

**Homework:**
Will be assigned later.

**Recitation:**
The recitation session will be used to learn how to apply the techniques learned in the lecture using a statistical package.

**Important Notes:**
• It is the student's responsibility to observe the academic calendar for important dates.
• Only University issued excuses will be accepted and only within a week of return to class.
• Excessive Absences will earn you a DN in accordance with University rules.

Detailed Syllabus

| Week | Topics | Exceptions |
|---|---|---|
| 1 | Chapter 1<br>Introduction | |
| 2-3 | Chapter 2<br>Simple Linear Regression | |
| 4-6 | Chapter 3<br>Multiple Linear Regression | 3.4.3 Simultaneous Confidence Intervals on Regression Coeffficients |
| 7-8 | Chapter 4<br>Model Adequacy Checking | |
| 9 | Chapter 5<br>Transformation and Weighting to Correct Model Inadequacies | 5.6 Regression Model with Random Effects |
| 10 | Chapter 6<br>Diagnostics for Leverage and Influence | |
| 11 | Chapter 7<br>Polynomial Regression Models | 7.3 Nonparametric Regression<br>7.5 Orthogonal Polynomials |
| 12 | Chapter 8<br>Indicator Variables | |
| 13 | Chapter 9<br>Multicollinearity | |
| 14 | Chapter 10<br>Variable Selection and Model Building | |
| 15 | Project Presentations | |