Name: Kent Riggs, Ph.D.
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Office: 350 NM
Office Hours: MWF 9-10:45, or by appointment
Class meeting time and place: MWF 11-11:50

Course Description:
Regression and model building, measure of model adequacy, transformations, prediction.

Program Learning Outcomes:
There are no specific program learning outcomes for this major addressed in this course. It is a general education core curriculum course and/or a service course.

Student Learning Outcomes:
At the end of STA 322, a student who has studied and learned the material should be able to:
1. Build a simple linear regression model. [EEO: 1, 4]
2. Assess the strength and appropriateness of a simple linear regression model. [EEO: 4, 6]
3. Interpret the following of a simple linear regression model: slope, intercept, point predictions, prediction intervals, and confidence intervals. [EEO: 1, 4]
4. Perform the first three bullets in the context of a multiple regression model. [EEO: 1, 4, 6]
5. Demonstrate an understanding of the least squares estimators. [EEO: 1]
6. Demonstrate the matrix representation of a Simple or Multiple Regression Model. [EEO: 1, 5]
7. Use residuals to check model assumptions. [EEO: 4, 6]
8. Identify outliers and influential points. [EEO: 4]
9. Use transformations to successfully (if possible) meet model assumptions. [EEO: 1, 6]
10. Use a statistical computer package in order to complete the analysis described in the above bullets. [EEO: 4]

Text and Materials:
A Second Course in Statistics: Regression Analysis by Mendenhall and Sincich, 7th edition

Course Requirements:
Homework and Exams

Course Calendar:
Course outline: Approximate time spent

Simple Linear Regression 20%
  Scattered plots
  Ordinary Least Squares Estimation
    Normal Equations
    Properties of Least Squares Estimators
  Variance Estimation
o Model Assessment
  □ F-test
  □ Coefficient of Determination
o Transformations
o Confidence Intervals and Hypothesis Tests for
  □ Slope
  □ Intercept
  □ Mean Response given X
o Prediction and Prediction Intervals

**Multiple Linear Regression** 30%
o Matrix Representation
o Ordinary Least Squares Estimation
  □ Normal Equations
  □ Properties of Least Squares Estimators
o Variance Estimation
o Model Assessment
  □ F-test
  □ Coefficient of Multiple Determination
o Transformations
o Confidence Intervals and Hypothesis Tests for
  □ Partial Slopes
  □ Intercept
  □ Mean Response given X
o Prediction and Prediction Intervals

**Regression Diagnostics** 30%
o Residual Analysis
  □ Normality
  □ Constant Variance
  □ Independence
o Outliers and Influential Points
  □ Outlier Tests
  □ Cook's Distance

**Variable Selection** 20%
o Multi-collinearity
o Stepwise Regression Methods

**Introduction to Special Topics in Regression** 10%
o Polynomial Regression
o Logistic Regression
o Poisson Regression
o Non-Linear Regression

**Grading Policy:** The final average will be computed using the following weights:

- Homework/Projects: 40%
- Exams: 60%
Attendance Policy:
Attendance/participation is expected.

SFASU Policy 5.4: The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;
2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend at least two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Academic Integrity (A-9.1):
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Withheld Grades Semester Grades Policy (A-54):
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.
Students with Disabilities:
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.